PARIA - KANAB CREEK

HABITAT MANAGEMENT PLAN

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THE PARIA-KANAB CREEK

HABITAT MANAGEMENT PLAN

WILDLIFE HABITAT AREA-T6

EFFECTIVE DATE: NOVEMBER 1983

ARIZONA STRIP DISTRICT-ARIZONA

BUREAU OF LAND MANAGEMENT

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CHECKLIST FOR PREPARATION AND REVIEW OF HABITAT MANAGEMENT PLANS

State Arizona

District Arizona Strip

Resource Area Vermillion

HMP Name and Number Paria-Kanab Creek WHA-T6

HMP Prepared by Sid Slone, Neal Middlebrook, Glen Dickens, Don Randal, Tom Britt

REVIEW CHECKLIST	SURNAME	DATE
1. Master Memorandum of Understanding, Sikes Act Agreement and/or Supplemental with State Agency.	▨	01/06/76 (Master) 03/02/76 (Sikes Act)
2. Preliminary meeting(s) with State Agency *(or other appropriate cooperators)* to jointly discuss HMP objectives.	▨	05-23-83
3. Endangered Species Act Compliance completed by	Slone SCS	30 Sept 1983
4. Review by District/Resource Area Specialists	Hughes Sandberg	10-4-83
Range		
Wild Horse and Burro		
Hydrologist		
Forestry	Davis	RD 10-4-83
Fisheries/Botanist/Wildlife Biologist	Middlebrook	10-6-83
Lands	Swapp	10-26-83
Minerals	Swapp	10 26-83
Recreation	Booker	WB
Wilderness/ACEC	Booker	WB
Cultural	Malcomson	10-4-83
Visual	Ray	10-11-83
Environmental Coordinator *(reviews EAs)*	Carter	10/24/83
Support *(Chief of Operations/Fire Management)*	Drew	
Others (ASO)	Mapston, Castellano, Avey	10-4 83
5. Reviewed by Area Manager	Leavitt	10/11/83
6. Reviewed by Chief of Resource Management	Anderson	10/11/83
7. Draft HMP and EA reviewed by State Agency authorized officer *or other cooperators).*	Packard	
8. Final review *(if appropriate)* by State Director		
9. Reviewed and approved by District Manager	Lamb	11/15/83
10. Approved by State Agency authorized officer	Bristow	

Remarks

☆ U.S. Government Printing Office: 1981-780-779/692 Reg. 8

ABSTRACT

INTRODUCTION

ABSTRACT

The Paria-Kanab Creek Wildlife Habitat Area (WHA-T6) was extensively surveyed for 2 years, 1981 and 1982, in preparation for the development of the Habitat Analysis (HA) and Habitat Management Plan (HMP).

The area's diverse terrestrial and aquatic wildlife communities have resulted in part from the area's complexity of geologic structures.

The Paria-Kanab Creek HMP presents an organized approach to maintenance, enhancement, and monitoring of wildlife habitat and communities, which will be integrated with other multiple use objectives and land uses.

Various HMP objectives are designed to enhance the quality and quantity of such habitat elements as food, water, cover, living space, and nutrients. Wildlife introductions were evaluated to reestablish extirpated wildlife populations.

The desired results of planned actions are to accomplish stated objectives by applying numerous wildlife management techniques, i.e., water development (catchments, springs), modification of range and waterlot fences, improvement of vegetation composition and availability by chemical, mechanical, and fire treatments, and monitoring of habitat conditions throughout the HMP area. Desert bighorn sheep that historically occupied the area will be transplanted and evaluated to ensure successful reestablishment.

Most of this HMP is expected to require 5 years to implement. Cost and implementation schedules are thus based on a 5-year period, as is the frequency of HMP revision.

An annual evaluation report will be used to determine overall progress towards HMP objectives and to summarize existing information needed for the 5-year revision.

An environmental assessment will not be performed on actions categorically excluded under 516 DM 2.3A(3) unless the anticipated impact of the action will significantly degrade the environment or unduly conflict with existing land uses.

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INTRODUCTION

I. INTRODUCTION

A. Location

The Paria-Kanab Creek Habitat Area - Terrestrial Number Six (WHA-T6) lies within the Bureau of Land Management's (BLM's) Arizona Strip District in Arizona. The "Strip" is separated from the rest of Arizona by the Colorado River. The HMP area's western boundary follows Kanab Creek from the Utah state line south to the boundary of Grand Canyon National Park. Kanab Creek also forms the eastern boundary of the Clayhole and Mt. Trumbull HMP areas. The Kaibab Plateau dissects the HMP area, and the North Kaibab National Forest forms the southern boundary. Grand Canyon National Park and Glen Canyon National Recreation Area form the HMP area's eastern boundary, and the Utah state line forms the area's northern boundary.

B. Acreage

A total of 740,000 acres of public, state, and private lands constitute the HMP area. Approximately five townships and eight ranges of the Gila-Salt River Base Meridian are encompassed by the area, which is centered in T39N and R4E.

The public lands of WHA-T6 are administered by the BLM, and species management is the responsibility of the Arizona Game and Fish Commission, which is administered by the Arizona Game and Fish Department (AGFD) Region II in Flagstaff, Arizona. The HMP area lies in game management units 12A and 12B.

C. Justification

The need to intensify wildlife habitat management of the Paria-Kanab Creek area was identified in the Vermillion Management Framework Plan (MFP) and the Vermillion Grazing Environmental Statement (ES). Moreover, accelerated mineral exploration and production and

other land uses within the area have increased the need to develop habitat objectives through the HMP process.

A systematic approach to monitor, maintain, and improve the quality and quantity of food, water, cover, living space, and nutrients of wildlife habitat is essential to provide for the diverse requirements of associated wildlife species.

To integrate the habitat needs of wildlife in the context of multiple use management and identify future land uses or actions that require monitoring, an HMP was planned for development. Accordingly, the following steps were taken to acquire information needed to establish resource bases and analyze current land uses:

1. An intensive vegetation inventory was conducted in desert bighorn sheep habitat to establish available food resources in the 1981/82 field seasons.
2. All major spring and riparian habitats were documented as to habitat condition, availability, and accessibility to wildlife during this same period.
3. All range and waterlot fences were inventoried in antelope habitat to assess their negotiability by antelope.
4. Mule deer water, food, and cover conditions were analyzed throughout the HMP area.
5. Occurrence and distribution records for all nongame species were analyzed along with present habitat conditions.
6. Pertinent information was obtained from AGFD wildlife and harvest records, published literature, and BLM records.
7. A habitat analysis was written, based on all existing data.
8. The habitat analysis was reviewed by BLM at the district office level and by personnel of the AGFD at the regional office.

9. From opportunities and recommendations identified in the habitat analysis and guidance and decisions of the Vermillion Management Framework Plan (MFP) and Vermillion Grazing ES, objectives and planned actions were developed.

Public land legislation requires that habitat for wildlife species be conserved and that the recreational, aesthetic, and scientific values of these species be perpetuated.

This HMP has been developed under Sikes Act authority. The HMP was cooperatively developed under the Master Cooperative Agreement (January 6, 1976) and the Sikes Act Supplement (March 2, 1976) between the AGFD and the Department of the Interior, BLM, which states:

"The Department and Bureau mutually agree:

> To cooperate in the identification of the national resource lands having wildlife values, as determined by the Department and the Bureau, and in the formulation and execution of comprehensive plans or programs for the management of wildlife resources on the national resource lands and by revisions as needed to keep such plans or programs current.
>
> To cooperate in the inventory, cooperative research, and management study of wildlife and wildlife habitat relationships on or adjacent to national resource lands, as necessary to ensure the welfare and proper management of the species and its habitat.
>
> To cooperate in the restoration, harvesting, and general management of the wildlife resources of the State of Arizona consistent with the multiple land use program."

The plan calls for the AGFD and BLM to work in harmony to maintain, improve, and manage the wildlife resources and their habitat for the best interest of the people of Arizona and the United States. It in no way diminishes the authority of the State of Arizona to own, control, and manage the state's wildlife or the

BLM's mandate to manage wildlife habitat on the public lands.

D. Topography/Geology

The HMP area varies from steep-talus cliffs of sharply dissected canyons such as Kanab Creek and Paria Canyon to the relatively flat undulating topography of the Paria and Kaibab Plateaus (Buckskin Mountains). The complexity of geologic structures resulting from uplifting in fault areas and differential erosion throughout the habitat area has created a wide variety of diverse habitats in a small geographic area.

Other prominent features include Vermillion Cliffs, Coyote Buttes, Gunsight Point, Sunshine Point, Water Canyon Point, and Hacks and Grama Canyons.

E. Soils

Soils of the Paria Canyon, Paria Plateau, House Rock Valley, and Ferry Swale areas are formed mainly from sandstone of the Mesozoic age. The Buckskin Mountain soils are derived from Kaibab Limestone of the Paleozoic age, and soils of Water Canyon Point, Gunsight Point, and Sunshine Point are derived from Moenkopi Sandstone. Soils in Kanab Creek Canyon are derived from limestone and sandstone. Eight soil associations occur within the HMP area. See the Habitat Analysis for a more detailed discussion of soils.

F. Climate

The climate of the HMP area is the typical southwestern bi-seasonal regime, having winter precipitation, spring drought, summer precipitation, and fall drought, with decidedly variable amounts of precipitation from year to year. Topography and elevation influence local climate. Increasing elevations have higher precipitation and lower mean temperatures. The area's average annual precipitation is

estimated at 8.6 inches, although the averages range from 4.9 inches at Wahweep to more than 15 inches on the Paria Plateau and in the Buckskin Mountains.

Precipitation in July and August is slightly higher than during the winter. May and June are normally the driest months. Summer precipitation comes from primarily convectional, often intense, local storms, usually less than 3 miles in diameter. These storms are occasionally violent, with high winds, torrential rains, rapid runoff, and local flash flooding. Winter precipitation is usually less intense and therefore more readily available to the soil. Ten rain gauges are read quarterly throughout the HMP area.

G. Flora

The Paria Canyon, Vermillion Bench, Paria Plateau rim, Kanab Creek Canyon, and rim habitats were intensively surveyed during the 1981/82 vegetation inventory. Vegetation in all other areas, such as House Rock Valley, Buckskin Mountains, and Gunsight Point were analyzed through existing information derived from allotment inventories.

The following 15 vegetation communities or standard habitat sites (SHSs) were identified during the habitat analysis phase:

1. Ponderosa Pine
2. Pinyon-Juniper Woodland
3. Sagebrush (two subtypes)
4. Sagebrush-Desert Shrub (three subtypes)
5. Mountain Shrub (three subtypes)
6. Oak-Desert Shrub (two subtypes)
7. Desert Shrub (four subtypes)
8. Grassland-Desert Shrub (three subtypes)

9. Half Shrub-Desert Shrub (four subtypes)

10. Blackbrush (four subtypes)

11. Blackbrush-Desert Shrub

12. Blackbrush-Shadscale

13. Ephedra (two subtypes)

14. Saltbush

15. Wet Meadow/Riparian/Floodplain (three subtypes)

Abrupt changes in soil type, exposure, elevation, and thus precipitation allow the establishment of a highly diverse flora.

Threatened and endangered plant species in the HMP area are listed in the _Federal Register_ on July 1, 1975, revised, and again published in the _Federal Register_ on June 16, 1976.

Fifty-one species from the Smithsonian lists occur or possibly occur in the HMP area. Twenty-five of these plants have been located through field searches in 1976 and 1977 and may be found within the HMP area.

The most common species of threatened and endangered plants are:

Pediocactus sileri
Pediocactus bradyi
Astragalus striatiflorus
Castilleja kaibabensis
Eriogonum zionensis var. _coccineum_

Extensive field studies found that the proposed threatened and endangered plants in or near the HMP area are highly soil specific or site specific and therefore restricted in distribution.

H. _Fauna_

Desert bighorn sheep (_Ovis canadensis nelsoni_) are the featured species of the Paria-Kanab Creek HMP area. Remnant bighorn populations inhabit public lands in Kanab Creek and Paria Canyon and are

considered transient populations moving on and off National Park Service lands.

Mule deer (Odocoileus hemionus) occur throughout the HMP area except for lower elevations of House Rock Valley. Highest summer range densities are found on the Paria Plateau, Buckskin Mountains, and Kanab Creek rim south of Water Canyon Point. Besides supporting resident populations, many of the areas surrounding the Kaibab Plateau (Gunsight Point, Snake Gulch, and Buckskin Mountains) serve as winter range for the Kaibab deer herd. A small population of deer that summer in Utah use the Buckskin Mountains and Shinarump Plateau as winter range, especially during severe winters.

Pronghorn antelope (Antilocapra americana) inhabit House Rock Valley and the lower sections of Coyote Valley. Herd size is approximately 80-90 animals.

Gambel quail are native to the habitat area and are found in small numbers just south of Fredonia in Kanab Creek. Good numbers of quail occur periodically. Quail have been observed in Kanab Creek, Hacks Canyon, Grama Canyon, Warm Springs Canyon, Johnson Run, and surrounding areas during productive years.

Mourning dove nest throughout the HMP area. The nesting season generally extends from May to the end of August. Dove adapt to numerous ecological types, and much ground nesting occurs where trees and shrubs are lacking. By the beginning of September the doves have usually begun their southward migration.

Chukars were first introduced to the HMP area in 1949 when the AGFD released 200 game farm birds near Fredonia. This population did well for 2 years, but then died out or dispersed from the area. In the winter of 1959-60, 333 live trapped chukars from Nevada and

California were released in Snake Gulch. AGFD and BLM specialists have observed these birds in Snake Gulch, Warm Springs Creek upstream to Ryan, Slide Canyon, Gunsight Reservoir, and at permanent waters in Kanab Creek from Hacks Canyon to the Grand Canyon National Park boundary.

A small colony of beaver (Castor canadensis) exists at the mouth of Wrather Canyon. This population has established in the last 3 years and is considered transient in nature.

Approximately 36 miles of the Paria River support populations of speckled dace (Rhinichthys osculus), bluehead mountain sucker (Pantosteus discobolus), flannelmouth sucker (Catostomus latipinnis), and razorback sucker (Xyrauchen texanus) (State-listed threatened). Between 1969 and 1972 the federally-listed woundfin minnow (Plagopterus argentissimus) was stocked several times in the Paria River in an attempt to establish another viable population. No woundfin have been collected since their introduction. Because of the relatively unaltered nature of the Paria's aquatic system the Woundfin Recovery Team at one time was considering the Paria as a tentative release site if reintroduction efforts within its native range failed.

Waterfowl and shorebird habitat is limited to stock reservoirs, Johnson Wash, and areas along the Paria River and Kanab Creek. Little aquatic or shoreline vegetation is present around stock reservoirs to provide needed cover and food resources for waterfowl. Moreover, most reservoirs dry up in the summer, causing extreme fluctuations in water levels and making the establishment of waterfowl food and cover nearly impossible. A complete species list of shorebirds and waterfowl appears in the habitat analysis.

The HMP area's largest carnivore is the mountain lion (Felis concolor), which is found throughout the area except in the lower portions of House Rock Valley.

The kit fox (Vulpes macrotis) and the raccoon (Procyon lotor) are confined largely to Paria Canyon and House Rock Valley. The only confirmed red fox (Vulpes fulve) population on the Arizona Strip occurs in the Paria-House Rock area. Very little is known about this population.

Two endangered birds of prey occupy the HMP area: the peregrine falcon (Falco peregrinus) and the bald eagle (Haliaeetus leucocephalus). Peregrine breeding habitat includes Paria Canyon and Kanab Creek. Peregrines also use the HMP area as wintering habitat. The bald eagle is a rare winter migrant.

The prairie falcon (Falco mexicanus), red-tailed hawk (Buteo jamaicensis), golden eagle (Aquila chrysaetos), Cooper's hawk (Accipiter cooperii), and the great horned owl (Bubo virginianus) are the most abundant and widely distributed birds of prey within the HMP area.

A total of 226 species of birds potentially inhabit the HMP area either yearlong or periodically throughout the year. An estimated 25 percent or 56 bird species use the HMP area as winter habitat, but only 14 percent or 8 species limit their use strictly to winter. The breeding component represents 126 species or 56 percent of the total avifauna. Transient and migratory species constitute 41 percent or 92 species.

Twelve species of birds occupying riparian/wet meadow habitats and pinyon-juniper woodlands are considered sensitive or indicator species. In riparian/wet meadow communities the Bell's vireo, blue

grosbeak, black-headed grosbeak, yellow warbler, northern oriole, summer tanager, and Abert's towhee are sensitive to environmental changes. Within the pinyon-juniper woodland, sensitive bird species include the scrub jay, pinyon jay, gray flycatcher, plain titmouse, gray vireo, and white-breasted nuthatch.

Within the HMP area, the Kaibab Plateau and Grand Canyon are considered geographic barriers that encourage both specific and subspecific speciation of amphibians, reptiles, and small mammals. The HMP area is interesting because of these geographic barriers and the small amount of collecting that has occurred. Little information exists on amphibians, reptiles, and small mammals east of Kanab Creek except for the Kaibab Plateau. House Rock Valley, Paria Plateau, and Ferry Swale areas have received little attention. The Grand Canyon, Kanab Creek, and Paria Canyon also provide major corridors for amphibian, reptile, and small mammal dispersal into the HMP area. Likewise, the extensive cliffs around the Paria Plateau--except for the north end--may have provided the isolating mechanisms necessary for subspecific speciation.

Forty-four small mammal and bat species occur within the HMP area. Small mammals and bats with limited distribution or sensitive or environmental change are listed in the following table.

SPECIES	HABITAT	SPECIAL REQUIREMENTS AND REMARKS
Desert Shrew (*Notiosorex crawfordi*)	Desert Shrub Blackbrush	Mesic/semi-mesic areas.
Spotted Bat (*Euderma maculata*)	Cliff areas Desert Shrub Blackbrush	Solitary rooster. Potential T & E species.
Desert Pocket Mouse (*Perognathus pernicillatus*)	Desert Shrub Blackbrush	Sandy soils near cliff areas.
Great Basin Pocket Mouse (*Perognathus parvus*)	Sagebrush Grassland	In close proximity to pinyon-juniper woodland.

SPECIES	HABITAT	SPECIAL REQUIREMENTS AND REMARKS
Merriam's Kangaroo Rat (Dipodomys merriami)	Desert Shrub Blackbrush Sagebrush	Disjunct populations.
Chisel-toothed Kangaroo Rat (Dipodomys microps)	Desert Shrub Sagebrush	Limited distribution.
Short-tailed Grasshopper Mouse (Onychomys leucogaster)	Grassland Sagebrush	Limited distribution.
Bushy-tailed Wood Rat (Neotoma cinerea)	Pinyon-Juniper Woodland Mountain Brush	Limited to high elevation areas.

Thirty-seven species of amphibians and reptiles inhabit the HMP area. Unique and sensitive herpetofauna are listed below:

SPECIES	REASON
Southwestern Toad (Bufo microscaphus)	Lack of sufficient distribution and habitat use information.
Great Plains Toad (Bufo cognatus)	Lack of sufficient distribution and habitat use information.
Canyon Tree Frog (Hyla ariencolor)	Crucial habitat requirements and restricted distribution.
Western Skink (Eumeces skiltonianus)	Limited distribution and strict habitat requirements.
Many-lined Skink (Eumeces multivirgatus)	Hypothetical distribution and strict habitat requirements.
Chuckwalla (Sauromalus obesus)	Very sensitive to livestock grazing. Low reproduction rates, herbivore.
Gila Monster (Heloderma suspectum)	Low reproduction rates, small population numbers, state-listed sensitive species.
Western Terrestrial Garter Snake (Thamnophis elegans)	Restricted distribution, strict habitat requirements.
Sonoran Mountain Kingsnake (Lampropeltis pyromelana)	Specialized habitat preference, restricted distribution, poor habitat conditions.
Milk Snake (Lampropeltis triangulum)	Limited distribution, isolated populations.
Black-tailed Rattlesnake (Crotalis molossus)	Lack of distribution and habitat use information.
Grand Canyon Rattlesnake (Crotalis viridis abyssus)	Limited distribution, lack of distribution and habitat information.

I. Livestock

The Vermillion MFP and the Vermillion Grazing ES provides for grazing of domestic livestock throughout WHA-T6 under the multiple use concept. Forty-six allotments support 37,263 AUMs (5-year average actual use) or 3,105 cattle and horses yearlong.

A total of 29 allotments or 63 percent of the HMP area is currently under deferred, deferred rotation, or rest rotation grazing systems (intensive management). Alternative 6 or less intensive management (45 percent utilization) accounts for 20 percent or nine allotments, whereas custodial management is prescribed for seven allotments or 15 percent. No domestic sheep are authorized. All but less intensive allotments are managed for an average of 50 percent utilization of key forage species.

Livestock-wildlife competition for food and water is a recognized problem within the HMP area. Canyons and drainage bottoms and areas around water sources are the most heavily grazed. Areas 3-5 miles from water and steep rocky talus side slopes of canyons are lightly to moderately grazed. Many of the rocky talus areas of canyons along Kanab Creek and sections of the Vermillion Bench foothills receive little or no grazing.

Twenty-eight allotments in the area have allotment management plans (AMPs) developed and six are scheduled for future development. A total of seven allotments under custodial management will not have AMPs developed. Four allotments are partially implemented. Table 1 shows current livestock grazing operations.

J. Water

Small but important spring and riparian environments exist throughout the HMP area. Approximately 700 acres of riparian and

Table 1

GRAZING ALLOTMENTS IN THE HMP AREA

ALLOTMENT NAME	NO.	PERMITTEE	MGMT. TYPE	AMP STATUS	CLASS LVSTCK	SEASON OF USE	GRAZING PREF. (AUMs)	5-YEAR AVERAGE LICENSED USE
Badger Creek	5341	Stan Rodgers	2	A	+	Yearlong	93	137
Beanhole	5334	Don Mackelprang	1	B	+	Yearlong	1,314	1,111
Blue Pools	5339	Jackson Cattle Company	1	B	+	8/1-3/31	520	215
Brown & Shumway	5302	Jim Ott	1	B	+	11/16-5/15	90	91
Buffalo Tank	5335	E.J. Graff	1	A	+	Yearlong	2,016	2,556
Button	5308	Cecil C. Pugh	2	A	+	11/15-5/31	277	227
Cedar Knoll	5318	Mrs. Lyle D. Miller	1	A	+	11/16-5/15	960	777
Cedar Mountain*	5338	Preston Bunting & Sons	3	C	+	Yearlong	3,307	1,703 (72-78)
Cedar Ridge	5303	Bunting Brothers	2	A	+	4/16-5/15	78	82
Chatterly	5307	Button Cattle Company	1	B	+	11/1-5/31	370	427
Cowboy Butte	5310	LeRoy P. Judd	1	A	+	11/1-5/31	227	139
Coyote	5327	O.I. & Dixie Northcott	1	D	+	Yearlong	1,713	1,319
Cram	5333	E.J. Graff	1	D	+	Yearlong	1,888	1,380
Eight Mile Pass	5304	Finley Bunting, Jr.	4	E	+	4/27-5/10	17	25
Ferry Swale	5336	Kanab LDS Stake	1	C	+	10/16-5/31	1,230	661
Franks*	5326	Paul Jenkins	1	B	+	9/1-3/31	154	152 (72-78)
Franks Reservoir	5325	Malcolm & Robinson	1	C	+	11/10-5/10	108	234
Fuller Road	5324	Dale O. Spencer	1	A	+	Yearlong	1,102	950
Gramma Spring	5225	F. Heaton & O.H. Johnson	4	E	+	11/1-4/30	192	422
Gulch	5230	Owen H. Johnson	4	E	+ ++	11/1-4/30	96	90
Gunsight Point	5320	C.A. Griffiths & Sons	1	A	+	10/15-4/30	423	494
Hacks	5227	Elson Riggs	2	A	+	11/15-6/15	304	149
Highway	5312	Gene Heaton	1	A	+	Yearlong	68	34
House Rock	5331	John V. Schoppman Family	1	A	+	Yearlong	1,610	1,827
Jacob Canyon	5317	Clark Lamb	1	C	+	11/16-6/15	140	98
Johnson Run	5315	Gene Heaton	1	A	+	Yearlong	139	100
Johnson Spring*	5306	R.A. Von Hake	4	E	+	10/1-1/31	452	127 (72-78)
Kanab Creek	5321	Vern Carner	2	C	+	10/1-5/31	168	27
Kanab Gulch	5224	Preston Swapp Estate	4	E	++	11/11-4/30	105	111
Lee's Ferry	5337	E.J. Graff	1	D	+	11/1-5/15	400	60
Lost Spring Gap	5300	G. Elmer Judd	4	E	+	11/1-5/15	48	42
Muggins Flat	5313	Myers & Williams	1	A	++	10/8-5/20	268	266
Pigeon Tank	5322	Garn L. Swapp	1	A	+	11/16-6/15	581	694
Pratt Tank	5314	John P. Rich	1	F	+	11/1-6/30	800	272
Rider	5305	Iva Maddox	2	A	+	11/1-4/30	131	43
Rock Canyon Tank	5319	Alan C. Pingpank	1	F	+	1/1-5/31	690	574
Sage	5311	Preston Brooksby	2	C	+	6/1-9/30	243	169
Shinarump	5301	Carlos W. Judd	2	D	+	7/1-10/31	40	40
Shuttleworth	5309	Harold E. Pratt	2	A	+	Yearlong	1,091	679
Signature Rock	5350	Signature Rock Ranch	1	D	+	11/1-5/31	382	298
Soap Creek	5332	E.J. Graff	1	D	+	Yearlong	2,192	1,696
Two Mile	5328	Vern Carner	1	F	+	Yearlong	3,035	3,934
Vermillion	5329	Ramsey Cattle Company	1	A	+	Yearlong	11,658	11,757
Wahweap	5340	Melvin J. Schoppman	4	E	+	Yearlong	732	472
Water Canyon	5228	Rolland Lamb	1	F	+	11/1-3/31	108	187
White Sage	5349	Dr. Merlin Webb	1	A	+	6/1-10/31	429	415

Allotments: *Includes allotments in Utah Kanab Area Office; **Licensed use information taken from 1982 Rangeland Program Summary update, includes use prior to reduction of preference, hence some figures show higher use than preference.

Management Types: 1-Intensive; 2-Less-Intensive; 3-Maintain; 4-Custodial.

AMP Status: A-Implemented; B-Signed; C-To Be Written; D-Being Written 83; E-N/A; F-Partially Implemented.

Class of Livestock: +-Cattle; ++-Horses.

semi-riparian habitat occur along the Paria River from the Utah state line to the Glen Canyon Recreation Area boundary and 450 such acres occur in the Kanab Creek drainage from north of Clearwater Spring to the Kaibab National Forest boundary.

Paria Canyon, Vermillion Cliffs, and Coyote Buttes have less than 30 acres of spring habitat, and the Kanab Creek drainage has less than 10 acres. Few other springs lie outside these main areas.

Springs associated with all vegetation types in the HMP area are keyed to specific geologic formations. Most are contact springs that release water, usually in a canyon or cliff where the water-bearing layer is underlain by an impervious layer. Approximately 55 springs exist in the HMP area, with the wet meadows averaging less than 0.25 acres each. All major springs in the HMP area were inventoried except for inaccessible seeps or those that could not be located along the Vermillion Cliffs and Paria Canyon.

Most springs/wet meadows are in good habitat condition due to their inaccessibility to cattle. Likewise, the condition of riparian habitats depends on the intensity of grazing pressure and the season of use. A complete list of mesically adapted plant species is included in the habitat analysis.

The HMP area has 150 stock reservoirs, most of which are not reliable during spring and summer drought periods.

Numerous sandstone water pockets are found on the Paria Plateau. The Thousand Pocket and Water Pockets areas next to Ferry Swale contain fairly large sandstone water pockets. Accordingly, the esplanade geologic formation in the lower sections of Kanab [illegible] riparian [illegible] occur along the Paria River [illegible] [illegible] in the [illegible] [illegible] [illegible] and [illegible] [illegible] in the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] in the [illegible] National Forest [illegible].

Paria Canyon, Vermillion Cliffs, and Coyote Buttes have very high degree of scenic quality, and the [illegible] [illegible] [illegible] [illegible]. The [illegible] [illegible] [illegible] [illegible] areas.

[illegible] [illegible] in the [illegible] area, with [illegible] [illegible] [illegible] [illegible] [illegible] along the Vermillion Cliffs and Paria Canyon.

[illegible] [illegible] of [illegible] [illegible]. Likewise, the [illegible] of [illegible] [illegible].

The [illegible] area [illegible] [illegible], many of which are not [illegible] [illegible].

[illegible] [illegible]. Additionally, [illegible] [illegible] [illegible] [illegible]

Creek also provides a supplemental water source after rains. Most of the water pockets found, however, were shallow and probably do not contain water for extended periods. The storage capacity of most of these sandstone water pockets is limited, and these pockets provide only supplemental water.

Other than perennial waters the most reliable water sources are wells and water catchments. A total of 11 wells, 7 livestock catchments, and 2 wildlife catchments exist in the HMP area.

K. Fences

The HMP area has numerous fences to control livestock movement and use. Allotment and pasture boundary fences were not built until the early 1900s. Most recently built fences conform to BLM standards but some older fences are hazardous to wildlife. A field inventory in House Rock Valley found pasture fences restricting antelope movement. These fences will be modified.

Another common practice in the area is for ranchers to fence springs, troughs, and stock reservoirs with net wire in mule deer and antelope habitat. Five and six strand fences and net wire fences were used in the early 1900s to control domestic sheep around waters. A few troughs and reservoirs on the Paria Plateau are fenced with 5-6 strand or net wire fences, which preclude use by mule deer.

L. Human Population and Use of Area

Fredonia, Arizona, a town of 1,200 residents, is the main population center of the HMP area. In House Rock Valley, Marble Canyon, Cliff Dwellers, and Vermillion Cliffs are small settlements with year-round residents. A number of line cabins are scattered throughout the area to facilitate livestock operations.

Livestock production is the major use of the HMP area, providing the basis of support for approximately 13 families in southern Utah and northern Arizona. Forty-six allotments within the area are grazed seasonally or yearlong.

In the last 5 years uranium exploration and production have significantly increased. Fifty drill sites are scattered in and next to the Kanab Creek (Hacks Canyon, Robinson Canyon, Water Canyon Point, Nates Point, Gunsight Point, Bullrush Point, Sunshine Point, and Loco Point). The Hacks Canyon Mine employs between 30-50 people and has been in operation for 2.5 years. In Pigeon Canyon, the Pigeon Mine has not yet started production but will probably employ as many workers. The Kanab North exploration site will require 15-20 workers when operations start. Just recently uranium exploration is occurring near Grand Canyon National Park in House Rock Valley. The base of operations for the major uranium company in Fredonia, Arizona employs over 100 people.

Some exploration is also occurring along the Vermillion Bench (Sun Valley claims) and at the mouth of Paria Canyon (Red Wing claims) by independent miners.

The HMP area represents a major semiprimitive open space recreation resource, which includes sightseeing, hunting, hiking, nature study, research, photography, rock collecting, and camping.

Paria Canyon Primitive Area - Comprising 27,515 acres along the Paria River between Lee's Ferry and U.S. Route 89 in Utah, Paria Canyon is the HMP area's only designated primitive area. Here livestock grazing is permitted except in visitor concentration locations and developed areas (Whitehouse Ruins entrance station in

Utah). The lower 11 miles of Paria Canyon have been overgrazed by livestock in the past. Paria Canyon's Recreation Area Management Plan was updated in 1982.

Vermillion Cliffs Natural Area - The 50,136-acre Vermillion Cliffs Natural Area is a spectacular scenic attraction. The primary management objective of this area is to maintain its outstanding natural appearance. Grazing is permitted within the boundaries.

Big Sage Natural Area - This area was established by BLM to protect a natural stand of big sagebrush and comprises 320 acres located adjacent to the Grand Canyon National Game Preserve at T40N R1E Sec. 29 N1/2.

Grand Canyon National Game Preserve - Through Presidential proclamation the Grand Canyon National Game Preserve was established in 1906. The preserve includes 13,600 acres located in two separate tracts along the west boundary of the North Kaibab National Forest. Though livestock grazing is permitted, the main management emphasis is on big game (deer) habitat management. Mineral entry in the game preserve is not allowed.

State of Arizona Natural Areas - The Arizona Academy of Science proposed a natural area of undetermined size on the Paria Plateau to represent pinyon-juniper communities with extensive stands of big sage.

The HMP area's only ORV designation is for Paria Canyon Primitive Area, which is closed to all ORVs, and the Vermillion Cliffs Natural Area which is restricted to existing roads.

M. Wilderness and Unique Characteristics

All or part of nine wilderness study areas (WSAs) and instant study area (ISA-3) lie within the HMP area. Only portions of Hack

Canyon and Kanab Creek WSAs are within the HMP area boundary. The Arizona Strip WSA draft EIS proposed the following alternatives.

1. Proposed Action (Step 2 Vermillion MFP) recommended wilderness designation for 16,035 acres involving five WSAs.
2. Enhanced Wilderness (Step 1 Vermillion MFP) recommended wilderness designation for 53,486 acres, involving six WSAs and the Vermillion Cliffs Primitive Area.
3. Wildland Preservation recommended wilderness designation for 236,167 acres, involving all or part of nine WSAs.
4. The All Wilderness alternative recommended wilderness designation for 250,838 acres, involving nine WSAs and the Vermillion Cliffs Natural Area (ISA-3).

Although the Proposed Action and alternatives proposed by the EIS recommended various combinations of WSAs and changes in acreages of some, the nine WSAs and ISA-3 will be managed under the Interim Management Policy and Guidelines of December 1979 until Congress makes a final wilderness determination.

WILDERNESS STUDY AREAS WITHIN WHA-T6

NAME	ACREAGE
Ferry Swale (006A)	7,370
Judd Hollow (006B)	506
Paria Rim (006C)	106
Cedar Mountain (006D)	12
Paria Plateau (008A/19)	104,988
Overlook (008B)	7,348
Emmett Wash (009)	12,913
Kanab Creek (031)	39,242
Hack Canyon (033A)	63,682
Vermillion Cliffs (ISA-3)	14,671
TOTAL	250,838

N. MFP Decisions

The Vermillion Management Framework Plan (MFP) encompasses two planning units, the Antelope and Coconino. In Step 2 of the MFP recommendations are unit-wide or are broken out by a specific area (Areas 1-10), which often involve both planning units. The MFP serves as a land use plan that provides guidance in making resource decisions. All objectives and planned actions proposed in the HMP must conform to recommendations of the Vermillion MFP. The MFP may be reviewed in the Vermillion Resource Area Office of the Arizona Strip District.

Listed below are the Vermillion MFP decisions for the wildlife activity. (See Map of Vermillion Planning Unit on page 109 for location of units).

- Allocate big-game forage. Unit wide (#14)
- Introduce and reintroduce wildlife (antelope, desert bighorn sheep, and chukars). Unit wide (#6), Area 2 (#2), Area 5 (#6), Area 8 (#8, #9)
- Encourage harvest of furbearers. Unit wide (#5)
- Develop wildlife water in dry areas. Unit wide (#15)
- Improve waterfowl habitat. Unit wide (#15, #24)
- Determine overall influence of predators. Unit wide (#15)
- Inventory existing quail habitat. Area 2 (#2)
- Inventory raptor habitat and numbers and identify essential habitat needs. Unit wide (#17)
- Allow fence to be built only where absolutely necessary in big game habitat areas. Require fences to meet appropriate big-game specifications. Unit wide (#18)
- Apply vegetation treatments. Area 2 (#2D, #2F)

- Determine influence of raptors and develop management recommendations. Unit wide (#11)
- Limit fence construction to areas where it is an absolute necessity. Require new fences to meet wildlife specifications. Modify existing fences to meet these standards. Unit wide (#12)
- Establish a 400-head antelope herd on the Arizona Strip throughout Area 2 (#26).

O. Constraints

BLM Manual 6780 (Release 6-85 dated 12/28/81) was used as a guide with slight modifications to develop the Paria-Kanab Creek HMP.

The restrictions addressed in the Vermillion MFP, Vermillion Grazing ES, and the draft Arizona Strip WSAs draft EIS were used to shape and modify HMP objectives and planned actions. Additional policy and guidance was used during HMP formulation stages.

Wilderness. During implementation of the HMP the following guidelines will be used to ensure compliance with the IMP (12/79) and wilderness management policy (9/81).

- The building of all wildlife projects, including spring developments, catchments, and range and waterlot fence modifications, will not allow new vehicular access. Specific projects will be analyzed on a case-by-case basis.
- Wildlife projects will be maintained without creating new vehicular access.

- Mechanical land treatment will be permitted only to benefit threatened and endangered species. Prescribed burning may be used where necessary to maintain fire-dependent ecosystems.
- Aerial surveys and operations for developing and implementing habitat management plans (HMPs) and for yearly surveys conducted by state agencies (AGFD) will be permitted in wilderness areas.
- Outfitters and commercial guides can operate in wilderness areas as long as their guided outings do not impair wilderness values.
- Predator control for enhancing other species will be permitted only if specific offending animals can be identified. Predators will not be indiscriminately removed.
- Commercial trapping of fur-bearers will not be allowed. Any trapping in wilderness areas must not be the sole source of livelihood.
- Transplant or reintroduce into wilderness areas native wildlife once occupying an area but not at self-sustaining population levels.
- Introduce no non-native wildlife species to wilderness areas.

Recreation. The Vermillion MFP recommends an ORV designation of open, closed, or limited for all public lands in the HMP area. On "open" areas and trails ORVs can be operated. "Closed" areas and trails are permanently or temporarily prohibited to all ORV use. In "limited" areas, ORVs are subject to restrictions, such as types and numbers of vehicles, time of use, and areas or trails used. The Paria Canyon Primitive Area and the Vermillion Cliffs Natural Area

are the only areas within the HMP area that have been formally designated.

All actions conducted during HMP implementation will be consistent with ORV designations, and projects will be designed and located to meet visual resource management objectives.

Minerals. The entire HMP area is open to mineral, oil, and gas exploration and production except for Paria Canyon Primitive Area, which was closed after designation and the Grand Canyon National Game Preserve.

Surface management of public lands is outlined in 43 CFR 3809 and 3802. The Vermillion MFP establishes constraints for the minerals program.

Range. Outlined in the Vermillion MFP are specific range management constraints. The objectives of the range management program are to increase or maintain forage production to meet Class I grazing qualifications, implement AMPs to improve or maintain range conditions, and increase livestock water distribution and livestock distribution patterns.

Cultural Resources. All HMP projects will require cultural resource clearance before construction. Certain HMP projects may have to be relocated to avoid disturbing archaeological sites.

Forestry. The removal of pinyon pine and juniper for firewood and posts may be allowed in the HMP area. The harvesting of desert vegetation for landscaping or seeds will also be permitted.

OBJECTIVES

II. MANAGEMENT OBJECTIVES

AGFD and BLM cooperatively developed management objectives for the Paria-Kanab Creek HMP. These objectives were formulated from various planning documents, policy and guidance, and environmental legislation. The Vermillion Grazing ES, the Arizona Strip WSA draft EIS, and the Vermillion MFP were the documents most often used. Objectives were further refined during the habitat analysis phase of the HMP process.

HMP objectives were broken out by key species or major groups of species, which is similar to the habitat analysis sections. HMP objectives were divided into the following sections:

- Desert Bighorn Sheep Management..............................BS
- Mule Deer Management..MD
- Pronghorn Antelope Management................................PA
- Upland and Small Game Management..............................UG
- Native Fish Management..NF
- Birds of Prey Management......................................BP
- Carnivore Management...CVR
- Nongame Management..NG
- Riparian/Spring Habitat Management.........................RSHM

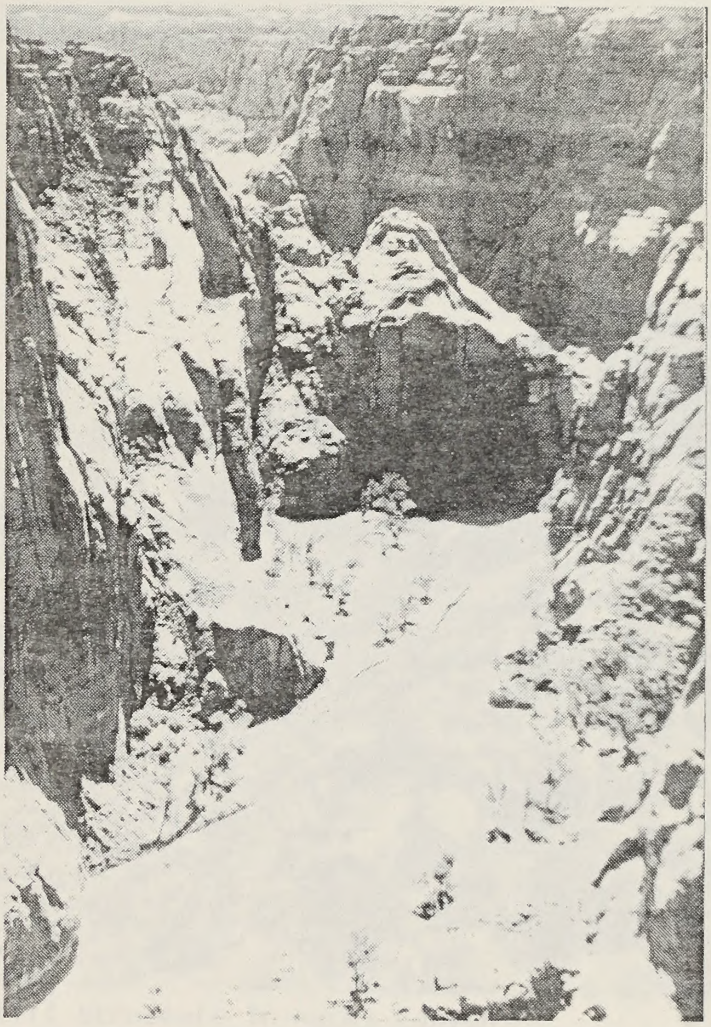
A background was developed for each objective, which was a summary of the existing situation as outlined in the habitat analysis. From the background an objective was formulated.

Many of the objectives can potentially benefit a number of wildlife species, but each objective was assigned to the species or habitat that would derive the greatest benefit from the objective.

DESERT
BIGHORN SHEEP
MANAGEMENT

DESERT BIGHORN SHEEP HABITAT IN PARIA AREA

Typical bighorn sheep habitat along talus of lower Paria Canyon.



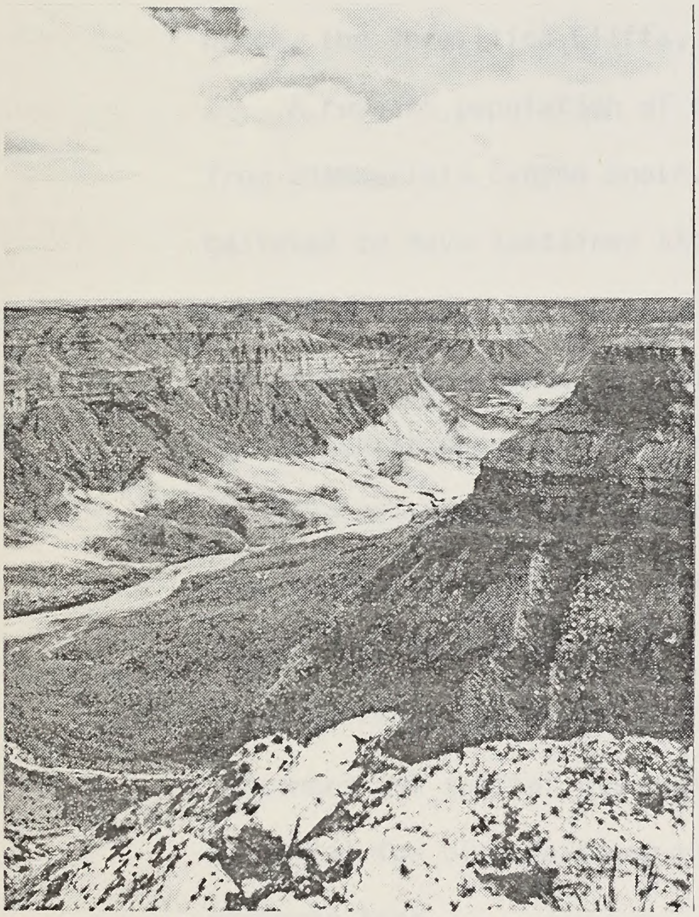
Bighorn sheep habitat in upper Paria Canyon near Wrather Canyon.

Bighorn sheep habitat along the Vermillion Cliffs rim. This is also important mule deer habitat.

DESERT BIGHORN SHEEP HABITAT

IN

HACKS CANYON/KANAB CREEK AREA



Overview of bighorn sheep habitat. Hacks Canyon is in the foreground and Kanab Creek in the upper right background.

Talus/cliff structure in Hacks Canyon provides excellent bighorn escape cover.

Desert Bighorn Sheep Management

BS-1

Background. Of the 740,000 acres in the Paria-Kanab Creek HMP area, only 13 percent or 97,000 acres of available desert bighorn sheep habitat exists. A total of 27,000 acres exists on public lands in lower Kanab Creek south of Grama Point and in portions of Grama and Hacks Canyons. An additional 70,000 acres exist in the Paria area, which includes the Paria Canyon and rim, Water Pockets, Thousand Pockets, the Vermillion Bench, the Vermillion Cliffs, and the escarpments along the Paria Canyon.

A remnant population of desert bighorn sheep exists in Kanab Creek from Chamberlain Canyon south. Both the Paria and Kanab Creek areas are believed to have sustained sheep populations at one time. Because desert bighorn sheep populations are on an overall downward trend in the Southwest and their habitat is limited, good habitat condition must be maintained or enhanced where necessary.

The maintenance of good habitat conditions require that other land uses be conducted in such a way as not to alter existing conditions. This is not to say that other land uses automatically cause a deterioration in range conditions but that many factors such as increased human presences and spatial distribution of livestock may reduce an area's potential for bighorn sheep without any change in the land or renewable resource base.

Most of the sheep habitat areas have excellent forage and escape cover components but in some areas lack suitable water resources due to a natural lack of water or competition for existing water. Establishing water in these dry areas will enhance the overall habitat quality. Dry

areas include Hacks Canyon, Grama Canyon, lower Kanab Creek rim, the Paria Canyon rim, the Vermillion Cliffs rim, the mid-point between Jacob's Pools and Hob Brown Spring, and the area between Emmet Spring and Soap Creek Spring. Water developments lacking sufficient water at the source include Jacob's Pools, Upper Spring, and Fisher Spring. Wilson Canyon contains four to five large potholes in the sandstone substrata that hold several hundred gallons or more of water each. A seep in the same canyon has potential to be developed and piped into one of the potholes to make it more reliable.

Because bighorn sheep populations are now nonexistent or low, an infusion of sheep through a transplant program would be necessary to establish bighorn in available habitat. Such a program in conjunction with habitat management will provide an opportunity to establish self-sustaining bighorn sheep populations in historic habitat.

Objective. Re-establish and manage for 175 desert bighorn sheep in the Paria Canyon-Vermillion Bench area by 1995 and 130 sheep in the Hacks Canyon-Kanab Creek area by 2000.

BS-2

Background. Bighorn sheep habitat was analyzed and delineated in the habitat analysis. The quality of sheep habitat was evaluated based upon a literature review and fieldwork. Potential sheep habitat was defined as those areas thought to contain the necessary juxtaposition of desirable forage and adequate escape cover necessary to support bighorn sheep. Because other land uses could have a negative impact upon sheep use of their habitat, certain management restraints were recommended in the HMP. These restraints are based upon the assumption that bighorn

sheep will eventually occupy all available habitat. However, sheep may or may not use all available habitat. It is therefore important to determine those areas important for bighorn sheep and those areas not. Areas found to be unused by bighorn sheep should be released from the management restraints as soon as possible.

Objective. Obtain the knowledge necessary to make multiple-use decisions regarding potential conflicts between bighorn sheep and other land uses by 1990 or as soon as adequate data is obtained.

MULE DEER

MANAGEMENT

MULE DEER HABITAT

Overview of mule deer habitat in the Buckskins.

Examples of oak browse community within canyons along the west side of the Buckskin Mountains.

Mule Deer Management

MD-1

Background. Most of the HMP area except for House Rock Valley is used by mule deer at least occasionally. Three major areas are delineated by geography and deer use. They include the Paria Plateau, the Buckskins, and most of the area that lies south of Fredonia between Kanab Creek and the Buckskins. This latter area is referred to as the Gunsight area. A fourth area of less significance is lower Kanab Creek Canyon south of Grama Point. This area may be used as a deer migration corridor between the Kaibab and the west rim of Kanab Creek. Little data is available on deer movement through the Kanab Creek drainage.

Approximately 600 Kaibab deer winter on the HMP area. This number fluctuates considerably depending upon the Kaibab deer herd population and winter conditions on the Kaibab Plateau. High winter deer use areas include the Buckskins and the Gunsight area north of Snake Gulch. Deer use of lower Kanab Creek is unknown.

Resident deer populations are generally low throughout the HMP area but obtain their greatest number on the Buckskins. Both the Buckskins and the Vermillion Cliffs rim of the Paria Plateau have good summer habitat potential. The Vermillion Cliffs rim has excellent summer forage conditions but lacks dependable water resources to carry deer through the summer. The Buckskins has excellent summer and winter forage conditions in some areas, primarily along the west half, but has poor habitat conditions along the east half. Eight waters are distributed within the Buckskins but only 18,000 acres of the 42,000 acres of deer habitat are serviced by dependable waters. Gambel oak and bitterbrush production is

good in areas of the Buckskins where the pinyon-juniper canopy cover is absent or relatively open. In dense stands of pinyon-juniper, oak and bitterbrush are absent or suppressed. The correct juxtaposition of water and land treatments would greatly enhance summer and winter deer habitat on the Buckskins. The existing resident herd of approximately 180 deer could be more than tripled with adequate distribution of waters, improved forage conditions, and cover.

The Gunsight area supports about one deer per section yearlong in addition to the wintering deer herd. With the ongoing range improvement program, the resident herd could be doubled and the winter herd carrying capacity greatly increased.

Objective. Maintain and where applicable enhance deer habitat in the Buckskins, the Vermillion Cliffs, and the Gunsight area to meet the following objectives by 1990.

1. Increase the resident deer herd from 180 deer (3 deer/section) to 600 deer (10 deer/section) in the Buckskins.
2. Increase the resident deer herd from 60 deer (1 deer/section) to 180 deer (3 deer/section) within the rim area of the Vermillion Cliffs.
3. Increase the resident deer herd from 180 deer (1 deer/section) to 360 deer (2 deer/section) in the Gunsight Point area.

MD-2

Background. Livestock grazing systems are devised to maintain or improve range conditions based upon certain "key" livestock forage plants. Forage species such as Gambel oak are used by both livestock and deer but are usually not considered a key livestock forage plant. Under

certain conditions, competition for Gambel oak could be significant. The same may apply to other plant species. The determination of forage selection by ungulates using the same range is critical in devising grazing systems that will provide the best alternatives for proper management of all key forage plants for both livestock and wild ungulates is properly managed for.

Objective. Determine key forage species for livestock, mule deer, and bighorn sheep and determine the degree of forage competition between these animals by 1988.

MD-3

Background. Five reliable waters within deer habitat are unavailable or unsafe for deer use due to fence obstructions that do not meet Bureau standards. Such obstructions can keep fawns out or cause mortality of deer. These waters are Coyote Spring Reservoir, Bush Head Stock Tank, Middle Reservoir, Bentonite Reservoir, and Johnson's Spring. Since all five waters are located out of the service area of other waters, they are very important. The modification of the existing fences around these waters will make them safely available to deer.

Objective. Insure that key waters are safely available to deer by 1988.

MD-4

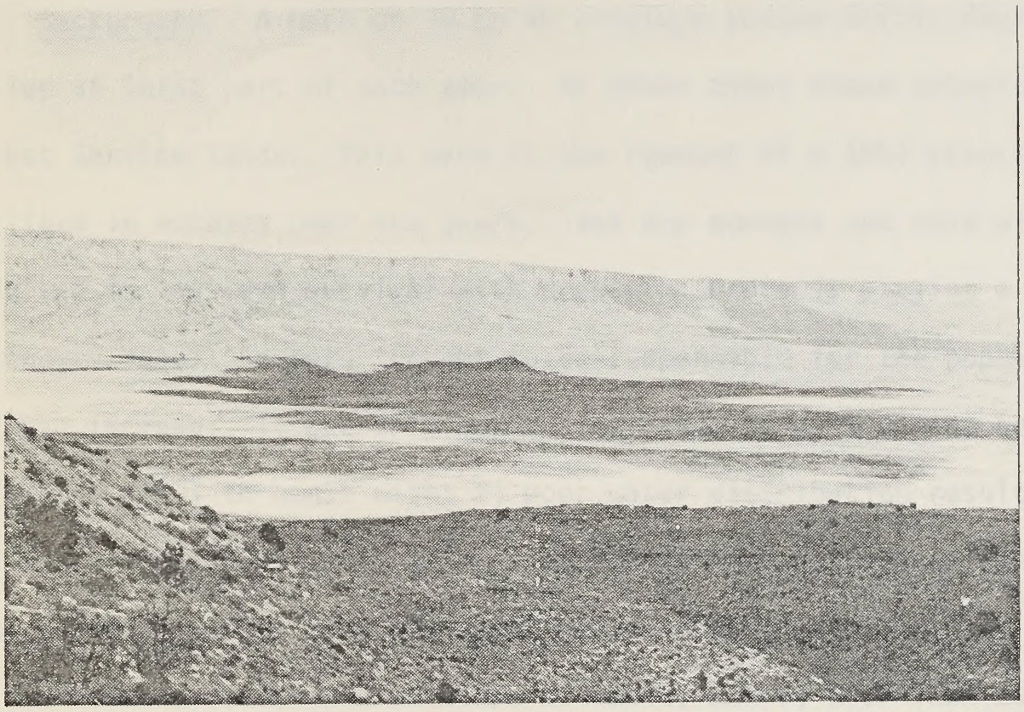
Background. Mule deer are known to winter in or along the rim of lower Kanab Creek Canyon. However, the extent of deer use is unknown. And likewise, the degree of potential forage competition between deer and bighorn sheep is unknown. If large numbers of deer move to the west rim

of Kanab Creek Canyon during the winter, then it may be appropriate to reevaluate the need for deer habitat improvement projects.

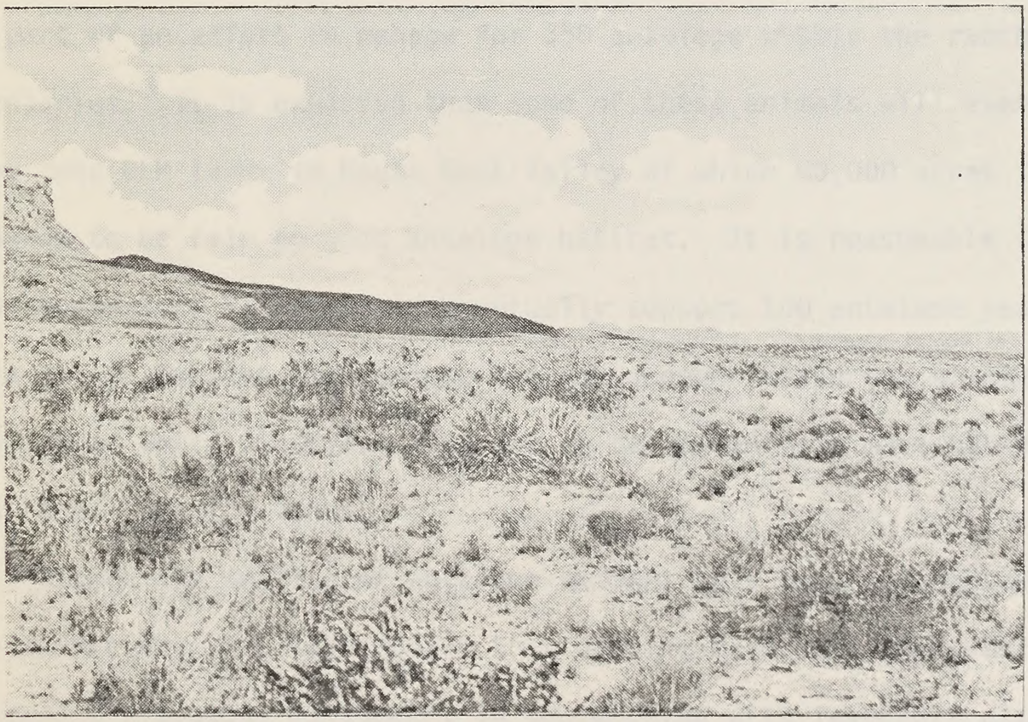
Objective. Determine the extent of deer movement through and use of lower Kanab Creek Canyon and west rim to analyze the need of habitat improvement projects and potential competition between deer and bighorn sheep by 1986.

PRONGHORN
ANTELOPE
MANAGEMENT

PRONGHORN ANTELOPE HABITAT



Overview of antelope habitat in House Rock Valley.
Foreground includes part of the Kaibab National Forest
with the Vermillion Cliffs in the background.



Typical grassland-desert shrub vegetation in House Rock Valley.

Pronghorn Antelope Management

PA-1

Background. A herd of 30 to 40 antelope occurs within House Rock Valley at least part of each year. At other times these animals are on Forest Service lands. This herd is the remnant of a 1951 transplant that declined in numbers over the years. Hot dry summers and cold winters resulted in low fawn survival with predation probably playing a key secondary role. Factors thought to be responsible for the population decline include: 1) the original transplanted population was below the threshold level to begin with; 2) poor water distribution resulting in the heavy grazing of range around dependable waters; 3) poor range conditions resulting from dry summers and heavy grazing; 4) the existence of fences that restricted antelope movement; and 5) poor fawn survival resulting from no. 2 and 3 above, and predation.

In December 1982, 50 antelope were released on AGFD's Buffalo Ranch as part of an effort to manage for 350 antelope within the ranch boundaries. It is expected that some of these animals will eventually move onto BLM lands in House Rock Valley of which 80,000 acres is considered to be fair to good antelope habitat. It is reasonable to expect that House Rock Valley could eventually support 100 antelope yearlong with proper habitat maintenance and enhancement measures; however, the population would fluctuate from day to day as animals move between BLM and Forest Service lands.

Though the decline of antelope numbers have been documented, many of the conditions that have caused this decline have been reversed. Intensive livestock management in conjunction with favorable climatic

conditions have greatly improved the range conditions in House Rock Valley over the past four to five years. By 1984 all of House Rock Valley will be under an allotment management plan or in the implementation stage of an AMP. The subsequent intensive livestock management in conjunction with the implementation of this HMP will improve antelope habitat overall and reverse the downward trend of the existing antelope population. Transplant programs to increase the core population to approximately 100 animals on the Buffalo Ranch and/or BLM lands would provide the threshold level necessary to see the antelope population take advantage of available habitat and increase to reasonable population levels.

Objective. Manage antelope and antelope habitat in House Rock Valley to increase fawn survival from an average of 5 fawns/100 does to 25 fawns/100 does by 1988 and for an overall population of 100 antelope by 1990.

PA-2

Background. Many misconceptions occur regarding antelope/livestock competition. Though some competition for forage occurs, the degree of competition is dependent upon the diversity and availability of forage and range condition and season of use. The establishment of antelope numbers are often based upon an arbitrary number that seems acceptable to all parties. Numbers are often not based upon biological data because the data is unavailable on a site-specific basis. Livestock operators are generally very concerned about the impacts of antelope on their livestock operations and tend to emphasize the competition for forage; however, preliminary data gathered elsewhere in the district tends to

show that competition between antelope and livestock for forage is generally insignificant. Such data goes a long way in resolving real or perceived conflicts. Adequate data helps to establish realistic animal numbers, identify where conflicts occur and the extent of conflicts, establish guidelines for resolving conflicts, and invalidates unfounded conflicts and concerns.

Objective. Determine key forage species for livestock and antelope and document the relative use of forage by each within House Rock Valley by 1986.

UPLAND AND SMALL GAME MANAGEMENT

Upland and Small Game Management

UG-1

Background. Chukar occur throughout the Kanab Creek drainage during most of the year, but apparently move onto the adjacent rim tops during late summer and early fall. Since Kanab Creek is often dry during the summer, chukar are believed to move to the rim tops to use existing water. Chukar were observed several times at Gunsight Tank when water was present. Gunsight Tank, however, is sometimes dry with no nearby water source. A reliable water source is needed along the east rim of upper Kanab Creek to provide for chukar water requirements during late summer and early fall. The addition of a reliable water on top will enhance recreation opportunities in providing more chukars for hunting. Few people hunt chukars in Kanab Creek because the area lacks vehicular access, and is very difficult to hunt.

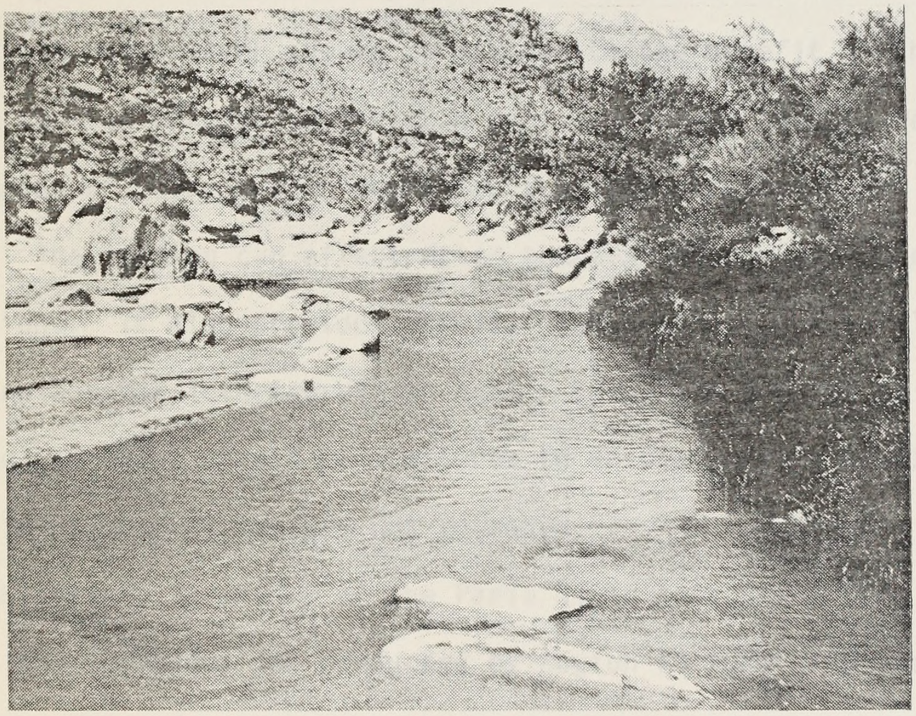
Objective. Improve chukar habitat and increase hunting opportunities by 1986.

NATIVE FISH

MANAGEMENT

NATIVE FISH HABITAT

PARIA RIVER



Typical run habitat in Paria River

Native Fishes Management

NF-1

Background. The loss and alteration of aquatic habitat in Arizona has been very detrimental to native fish populations. The Paria River system typifies the riverine characters that native fish adapted to. The more natural and unchanged aquatic systems that confluence with the Colorado River provide important nursery areas near the confluences and also support resident native populations in their mainstream. For this reason the Paria River should be managed to the benefit of the three native species that use the system to fulfill life history requirements.

Moreover, streamside vegetation stabilizes stream banks and provides cover. The shading can affect water temperature and buffer drought conditions. It also provides detrital and organic debris valuable to fish and aquatic invertebrate as food. Livestock grazing of the riparian and aquatic zones should be monitored to ensure aquatic habitat conditions for native fishes are not degraded.

An aquatic inventory of the Paria River took place from May 17-21 of 1982. The inventory was conducted by Region II AGFD with assistance from BLM personnel. A total of 15 stations were established and each station was sampled for physicochemical and biological information. This survey provided information necessary to write the habitat analysis and established baseline data for future surveys. The Paria River is one of the select few desert river systems in which significant aquatic habitat alteration has not occurred. Therefore, to detect changes in the river system, periodic surveys should be conducted to monitor the population condition of the native fish fauna.

Parcels of land along the Paria River not in Federal ownership create problems in effective habitat management. Currently, the Paria Canyon's Recreation Management Plan identifies acquiring parcels adjacent to the riparian zone. Therefore, all aquatic and riparian habitat in Federal ownership should be retained and other parcels acquired through exchange or purchase.

Objective. Maintain and where necessary improve aquatic and riparian habitat condition of 36 miles of the Paria River in order to sustain viable populations of speckled dace, flannelmouth sucker, blue-head mountain sucker, and razorback sucker.

NF-2

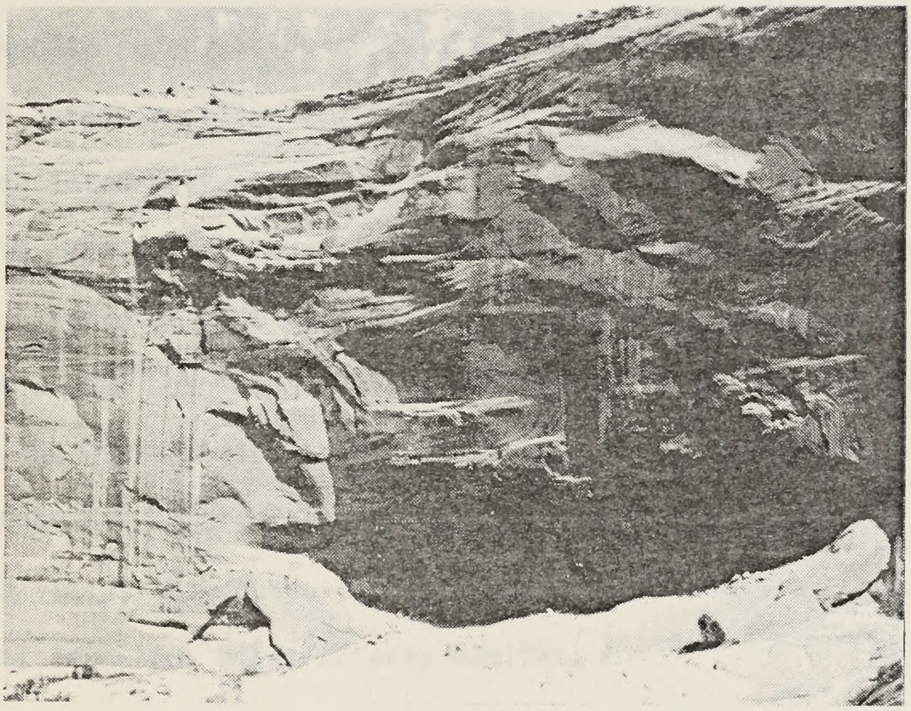
Background. Many of the introduced species of fish compete with native fishes for food, space, and cover and may actually become prey of introduced species. To help prevent the displacement of native fish faunas periodic surveys such as the one performed for this HMP should be conducted every 3-5 years.

Objective. Ensure a native fish fauna is maintained in the Paria River drainage in Arizona.

BIRDS OF PREY

MANAGEMENT

BIRDS OF PREY HABITAT



Navajo sandstone formation in Paria Canyon provides excellent peregrine nesting habitat.

Birds of Prey Management

BP-1

Background. Maintenance of good range conditions, especially in close proximity of suitable nesting habitat, is essential for managing birds of prey habitat. The vegetative species composition and density of perennial herbaceous species is related to prey abundance, therefore, vegetative communities in these areas should be maintained in good range condition to provide adequate prey populations.

In riparian broadleaf habitats management should focus on providing for adequate reproduction of existing cottonwood and willow stands through intensive livestock management to ensure adequate nest structures and associated prey base.

Over the last 5-10 years an increase in various land use activities has occurred over most of the HMP area. Mineral exploration and production has been accelerated, especially in the Kanab Creek drainage. Recreation use has also increased steadily over the last 3-5 years in the Paria Canyon Primitive Area as well as other areas. Both of these land use activities has caused increased vehicular access and human disturbance of important birds of prey habitat.

Under the Bald Eagle Act of 1974 and the ESA of 1978 (Section 7) the BLM must ensure these species are provided for in all land use actions and comply with the two acts mentioned above.

Two Federally listed species occur within the HMP area, the peregrine falcon and the bald eagle. Recently, the occurrence of both species has increased in the Paria and Kanab Creek areas to an extent where monitoring and surveying of actual and potential nest sites and roosts are warranted.

Objective. Provide for the biological and habitat requirements (suitable nesting and food resources) of all birds of prey and especially those protected by the Bald Eagle Protection Act and the ESA in relation to other resource programs involving habitat alteration and human disturbance.

BP-2

Background. The consideration of birds of prey in vegetative treatment, within and adjacent to treatment areas is essential in birds of prey management. The pinyon-juniper woodland also provides important habitat for nesting Cooper's hawk and wintering goshawks. Cooper's were found nesting in pinyon-juniper stands with a density of 32 to 68 trees/acre with a mean of 54 trees/acre. Canopy widths averaged 30-33 feet which would indicate extremely mature stands. Based on this information, mature stands approaching this stocking level (54 trees/acre) in the HMP area should be given special consideration in land treatment projects.

Objective. Provide for the habitat needs of birds of prey in vegetative treatment projects.

CARNIVORE

MANAGEMENT

Carnivore Management

CRV-1

Background. Little is known about the historical occurrence of predatory animals in the Paria-Kanab Creek HMP area. The area was visited by several groups of explorers and trappers during the pre-settlement era, 1923-1864 (Davis, 1973). These records provide little insight about the distribution or densities of predatory species. The documentation of unique and sensitive furbearers is essential.

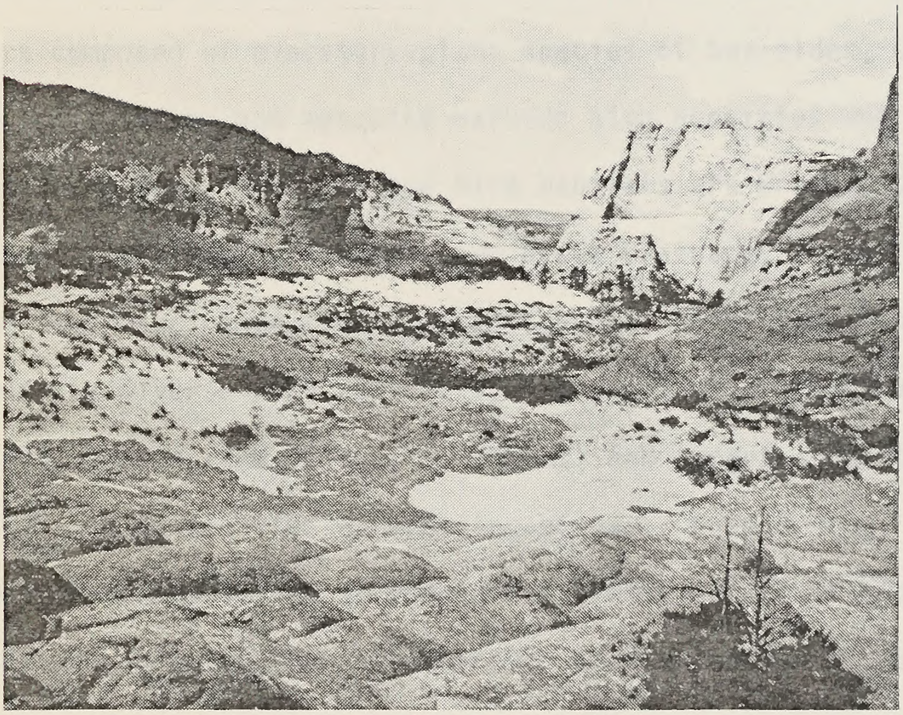
Predator hunting is an important recreation use second only to big game hunting in the HMP area. When other game seasons are closed, people enjoy calling predators. Predators have a positive value difficult to define. In recent years fur prices for the coyote, bobcat, and gray fox have increased greatly, resulting in increased interest in trapping. Predator harvest and control information should be monitored within the HMP area.

Objective. Maintain, improve, and monitor carnivore habitat and harvests to ensure a healthy and diverse predator component throughout the habitat area. Unique and sensitive furbearers should receive special attention.

NON-GAME

MANAGEMENT

NONGAME HABITAT



Coyote Buttes near Sand Spring. One of many unique areas in which nongame species occurrence information is nonexistent.

Nongame Management

NG-1

Background. Riparian and spring habitats display the highest density and diversity of both breeding and wintering birds. An estimated 50 species of breeding birds utilize riparian and spring habitats. Breeding densities will range from 200 to 400 pairs/100 acres.

The habitat's structural diversity both horizontally (patchiness) and vertically (structural height) is a major factor determining bird species diversity and density. For example, springs and riparian habitats composed of overstory plant species of box elder, cottonwood, willow, salt cedar, and mesquite harbour high densities and diversities of breeding birds. Rich nongame bird habitats are Wrather Canyon, Bush Head Canyon, Cottonwood Spring, Soap Creek Drainage, Badger Creek Spring, and the lower spring source in Water Canyon. Conversely, the less structurally diverse riparian and spring habitats of arrowweed, baccharis, common reed, cattails, rushes, and sedges support lower densities and diversities of breeding birds. Consequently, the maintenance of vegetative structural diversity (vertical and horizontal) of riparian and spring habitats through the monitoring of deciduous overstory species is essential.

Ponderosa pine habitat is very limited in the HMP area, confined to major slickrock drainages on the Paria Plateau. The stands are very open, mainly composed of older trees with some recruitment occurring. There are six major areas with ponderosa pine stands, however, other smaller drainages support scattered individual trees.

Management of ponderosa pine habitat is essential to ensure adequate recruitment of pines. The inventory and monitoring of the more significant stands are essential to provide for habitat needs of nongame birds and birds of prey which utilize them.

The availability and abundance of nongame bird food resources is directly related to the intensity of livestock grazing pressure. Consequently, allotments without proper grazing management produce less available food items for the attendant nongame birds. This is usually reflected in a decrease in nongame bird densities and diversity. The management objective should be to promote light-to-moderate livestock utilization levels and allow periodic rest and/or deferment of pastures to enhance seed and arthropod production and increase overall food supply.

The importance of maintaining structural height and diversity is well documented. It has been demonstrated that bird species diversity is related to foliage height diversity or vegetative cover. A decrease in structural complexity decreases available niches and thus creates an ecologically simpler habitat and avifauna.

Patchiness or distribution of cover plays a major role in bird species diversity and density. A habitat displaying a good patchiness component has tremendous ecotonal area. Patchiness of the vegetation improves the so-called edge effect and increases the habitat's value for wildlife.

Forage and cover conditions are fair to good on most grazing allotments in the HMP area. The Hack, Gramma, and Paria Canyon bottoms need improvement; otherwise, localized areas around stock waters are the only areas with degraded forage and cover conditions.

The distribution, occurrence, and habitat requirements are poorly known in the HMP area, especially for riparian, desert shrub-talus, and juniper savanah habitats. Accordingly, the documentation of occurrence and habitat requirements of sensitive species of nongame birds needs to be determined.

The Savory Grazing Method (SGM) proposed for the Signature Rock allotment can potentially degrade nesting habitat for ground- and shrub-nesting nongame birds. Short duration high-intensity grazing during spring and summer nesting periods could substantially deteriorate nesting cover. Structure and cover changes should be monitored to evaluate the impact of the Savory system on nongame bird breeding populations in Coyote Valley.

Food resources for small mammals within the HMP area are in relatively good habitat condition. Moderate to heavy grazing pressure in canyon and wash bottoms and around livestock waters are perennial problems of range management. Hacks, Gramma, and the lower sections of Paria Canyon are areas of concern with respect to small mammal forage resources.

In the HMP area domestic livestock have traditionally congregated in washes and bottoms, and around waters. Overgrazing can decrease adequate cover for small mammals. Better distribution of livestock and periodic rest should help to partially increase the cover density.

Numerous authors have commented on the Grand Canyon's isolating effect. For example, this barrier has restricted distribution of the Great Basin pocket mouse (Perognathus parvus), long-tailed pocket mouse (Perognathus formosus), and chisel-toothed kangaroo rat (Dipodomys microps) to north of the Colorado River and only on the Arizona Strip in

Arizona. The Virgin Mountains and Grand Wash Cliffs were also documented to be physical isolating mechanisms for three Mojave and three Great Basin species of small mammals.

Within the HMP area the Kaibab Plateau and the Grand Canyon are considered to be geographic barriers that encourage both specific and subspecific speciation, except for rock-dwelling forms.

The WHA is very interesting because of these identified geographic barriers and the limited amount of collecting. Little information is available on small mammal faunas east of Kanab Creek except for the Kaibab Plateau. House Rock Valley, Paria Plateau, and Ferry Swale areas have received little attention. The Grand Canyon, Kanab Creek, and Paria Canyon also provide major corridors for small mammal dispersal into the WHA. Likewise, the extensive cliffs around the Paria Plateau--except for the north end--may have provided the necessary isolating mechanisms for subspecific speciation. The documentation of the distribution occurrence and habitat requirements of selected species of small mammals and bats is essential to adequately assess the impacts of various land uses.

The maintenance of good habitat conditions in canyon situations, especially if perennial water is present, is critical to the survival of the more mesically-adapted amphibians such as canyon tree frogs, leopard frogs, and Woodhouse's toads. These isolated populations require good vegetative conditions adjacent to perennial and ephemeral water sources and a sufficient quantity of water at spring sources to sustain the vegetation and supply adequate breeding habitat.

The most extensive and important breeding habitat for amphibians in the HMP area are Paria River, Badger Creek, Soap Creek, Wrather Canyon, Bush Head Canyon, Wilson Spring, Sand Spring, Kanab Creek, Bessie Spring, and Dave Spring.

A good structural diversity in low height vegetation (perennial forbs and grasses) are essential to maintaining healthy reptile populations. The maintenance of good range conditions surrounding suitable cover sites (canyons, washes, and rock outcrop areas) will support higher numbers of prey species and thus amphibian and reptile populations.

Moreover, very little documentation is available on amphibian and reptile distribution in the HMP area and is mainly limited to casual observation. Much of the ecological distribution is based on Sherbrooke's (1966) study of the Mt. Trumbull-Toroweap Valley region, approximately 20 miles west of the western boundary of the HMP area (Kanab Creek). Other information sources on distribution include Arizona Strip District files, North Kaibab National Forest files, Stebbins (1966), Wright and Wright (1957), and Smith (1946).

A number of species and subspecies of herpetofauna within the HMP area are restricted in distribution by geographical barriers. The Grand Canyon and the Kaibab Plateau are isolating mechanisms and have led to increased speciation and subspeciation of herpetofauna in this area. Therefore, the documentation of the distribution, habitat preference, and basic habitat requirements of selected amphibians and reptiles throughout the HMP area needs to be determined.

Objective. Provide for the habitat needs (food, cover, nesting, and breeding resources) for nongame birds, small mammals, bats, amphibians, and reptiles through the maintenance and where necessary the enhancement of existing habitat conditions.

NG-2

Background. Approximately 55 species or 65 percent of the nongame birds within the HMP area are tree nesters. Therefore, the maintenance of nongame bird habitat will depend on the distribution, density, and age of stands of pinyon pine and juniper. Moreover, the importance of pinyon pine and juniper as an insectivorous and granivorous food base cannot be over emphasized. The production of pinyon pine seeds are crucial to the breeding component while juniper berries are important to the wintering segment.

Small mammals, amphibians, and reptiles are also keyed to specific food and cover resources associated with native or untreated habitat. The establishment of low height cover and the availability of adequate litter after treatment is essential to provide for the habitat needs of these species. It is also necessary to ensure that sufficient untreated habitat is retained in the immediate area.

Approximately 11,050 acres have been treated in the HMP area and an additional 13,450 acres are programmed through AMPs.

Basically, two management options should be considered when treatment of pinyon-juniper woodlands or other native habitats are scheduled. First, the design and layout of treatment areas should be geared to minimize the impact to nongame. Secondly, areas with a 2-3:1 ratio of pinyon pine to juniper should be considered for retention.

Objective. Maintain adequate habitat for nongame populations in the immediate area of vegetation manipulation projects and minimize the impact of treated areas through proper mitigation measures.

NG-3

Background. Dead trees (snags) provide two major requirements for cavity-nesters and other insectivorous birds. Of first importance are the nest sites for primary cavity-nesters (PCNs) and secondary cavity-nesters (SCNs). Secondly, the standing and downed snags harbor good insect populations which are important to all insectivorous nongame birds.

The HMP area contains 19 species of cavity-nesting nongame birds. Undoubtedly, the maintenance of healthy cavity-nesting populations will depend on the habitat condition and existence of the pinyon-juniper woodland and riparian and spring habitats.

Objective. Maintain suitable snag habitat within and adjacent to treated areas and riparian and spring habitats for primary and secondary cavity-nesting nongame birds.

NG-4

Background. The diversity of bat faunas in temperate areas is strongly influenced by the distribution, abundance, and types of available roosts. Nearctic bats need suitable roosts to meet their physiological requirements. Habitats displaying heterogenous roost structures such as caves, crevices, trees, old buildings, and rugged terrain have the potential to support rich bat faunas.

Bats are strongly roost-adapted, carefully selecting roosts on the basis of microclimatic conditions. The temperature and humidity of roosts restrict use of physiologically unsuitable structures. Therefore, an area with structures could in fact be very limited due to inadequate microclimatic conditions.

Objective. Protect bat roosts and hibernacula from human disturbance and maintain microclimatic conditions of roost structures.

RIPARIAN / SPRING
HABITAT
MANAGEMENT

RIPARIAN HABITAT

Typical cottonwood grove in Paria Canyon
which provides important nongame habitat.

Riparian and Spring Habitat Management

RSHM-1

Background. The value of spring and riparian habitats to wildlife communities cannot be overstated. These habitats display the highest nongame species diversity and density throughout the HMP area. Spring and riparian habitats are easily degraded by over-utilization by livestock or removal of water for culinary or livestock watering purposes. Cottonwood and willow recruitment has been a problem along the lower reaches of the Paria River and at a few of the wet meadow spring sites. Through fencing and planting programs these habitats can be upgraded, expanded, and maintained in a healthy condition.

Objective. Ensure spring and riparian environments are maintained in a productive habitat condition and where feasible expand and upgrade the habitat quality of this community.

RSHM-2

Background. An estimated 16 springs and seeps were not inventoried during the habitat analysis phase of the HMP process, because of inaccessibility or wrong legal locations. These springs should be fully documented to complete the inventory process and determine the status of their habitat condition.

Objective. Ensure adequate information is collected on all spring sources in the HMP area to provide sound habitat management recommendations.

III. PLANNED ACTIONS

A number of planned actions were developed for each management objective. Planned actions were developed to accomplish stated HMP objectives.

To enhance the usefulness of this HMP, habitat/species oriented categories were used to divide planned actions into the following appropriate categories:

- Aquatic Habitat Management
- Water Developments
- Modification of Existing Range and Waterlot Fences
- Habitat Studies and Monitoring
- Species Management
- Riparian and Spring Habitat Management
- Livestock Grazing Management
- Vegetation Treatments
- Criteria for Land Use Authorization

The species management category outlines the mutually agreed planned actions which AGFD felt were necessary to support the total HMP effort. These objectives are the responsibility of AGFD to accomplish since they deal directly with species-related activities.

AQUATIC HABITAT MANAGEMENT

Aquatic Habitat Management

NF-1a. Discourage any further diversion or impoundment of the Paria River, which would significantly change flows and water quality critical to native fish fauna. BLM and AGFD biologists will make recommendations as appropriate.

NF-1b. Support the acquisition of lands along the Paria River as identified in the Paria Canyon Recreation Management Plan. Keep all aquatic habitat now in public ownership in Paria Canyon and Kanab Creek drainage.

NF-2. AGFD will deny stocking requests for exotic fish species in the Paria River Drainage.

WATER

DEVELOPMENTS

Water Developments

BS-1c. Build the following catchments within the Kanab Creek Habitat Area:

Hacks Wildlife Catchment No. 1	T36N R4W Sec. 5
Hacks Wildlife Catchment No. 2	T36N R4W Secs. 2, 11, or 12
Grama Wildlife Catchment	T37N R4W Sec. 24 or 25

BS-1d. Modify Kanab Creek deer catchment to enhance its use by bighorn sheep by piping the water 0.25 miles to the south rim of Chamberlain Canyon.

BS-1e. Build the following water developments in the Paria Area.

Wilson Canyon Seep Development	T40N R7E Sec. 5 NE
Fisher Point Catchment	T40N R7E Sec. 9 NE
Fisher Spring Development & Pipeline	T40N R7E Sec. 16 SE NW
Badger Canyon Slickrock Catchment	T40N R6E Sec. 35 SW
Paria Canyon Rim Catchment	T41N R6E Sec. 23 NW
The Hole Slickrock Catchment	T41N R5E Sec. 12 NE
The Narrows Slickrock Catchment	T41N R5E Sec. 10 NE
Powells Monument Catchment	T40N R7E Sec. 19 SE
Jacobs Pools Upper Spring Dike	T39N R5E Sec. 31 NW
Paria Point Seep Development #1	T38N R5E Sec. 1 NW SW
Paria Point Seep Development #2	T38N R5E Sec. 10 NW
Moehnauve Seep Development	T39N R4E Sec. 22 S1/2

MD-1a. Build the following water facilities in the habitat management area (HMA) by 1988.

Rock Canyon Wildlife Catchment	T41N R2E Sec. 31 NE
Franks Wildlife Catchment	T41N R2E Sec. 10 SE
Pine Hollow Wildlife Catchment	T41N R3E Sec. 4 NE
East Buckskin Wildlife Catchment	T41N R3E Sec. 21 NW
Paria Point Wildlife Catchment	T38N R5E Sec. 2 NE

MD-1b. Modify the existing Jim's Catchment to provide storage and trough for deer use.

MD-1c. Cooperate with the funding of Soap Tank storage tank and trough to provide reliable water for deer.

MD-1d. Cooperate with the funding of the Pine Hollow Livestock Catchment (T40N R3E Sec. 8) on the Buckskins. This catchment is needed to implement the Coyote AMP and will provide a deer water.

PA-1d. Improve water distribution, reliability, and availability so that all areas of antelope habitat lie within 3 miles of water by 1988 by doing the following:

1. Cooperate with the funding of the Beanhole Livestock Catchment proposed in T37N R4E Sec. 4 NW. Wildlife funding will be used to help cover construction costs and to provide for a separate 2,500-gallon storage facility and ground-level trough. Water will be piped to at least two troughs for livestock and antelope use in the Buffalo Tank and Beanhole allotments. A third trough may be piped to the interior of the Beanhole allotment.
2. Install a 5,000-gallon storage tank at each of two pipelines to provide water year round for antelope. The storage tanks will be located at T37N R4E Sections 34 and 29. The permittee can now only run water through one of the pipelines at a time and has been shutting off the pipeline in the rested pasture. This project will allow troughs to be left on year round.
3. Pipe water 2 miles south from the proposed storage tank at T37N R4E Sec. 34 to T36N R4E Sec. 10 to provide water in an area not now adequately serviced.

4. Upgrade Woolley livestock catchment and install a separate 2,500-gallon wildlife storage facility. The catchment often goes dry under the existing situation. This action will insure a year round water supply for antelope.

UG-1. Build a chukar water with a 500-gallon storage capacity at the head of Gunsight Canyon and monitor the use of the water to determine if other chukar waters would be desirable.

MODIFICATION OF EXISTING RANGE AND WATERLOT FENCES

Modification of Existing Range and Waterlot Fences

MD-3. Modify the existing fences around the following waters to make them safely available to deer.

NAME	GEOGRAPHIC AREA	LOCATION
Coyote Springs Reservoir	Coyote Valley	T41N R3E Sec. 13
Bush Head Stock Tank	Paria Plateau	T41N R6E Sec. 27
Middle Reservoir	Buckskins	T41N R3E Sec. 7 SW
Bentonite Reservoir	Buckskins	T41N R2E Sec. 25 NE
Johnsons Spring	Shinarump	T41N R1E Sec. 5 SW NW

PA-1e. Modifying range fences will consist of replacing the bottom strand of barbed wire with a smooth wire 16 inches above ground, removing tumbleweeds, and making minor fence repairs. The following 40 miles of range fences will be modified by 1988.

PRIORITY	ALLOTMENT	MILES*	LOCATION
1	Buffalo Tank	2.0	T37N R5E secs. 30 & 31
		.5	T36N R5E sec. 6
		3.75	T36N R4E secs. 1, 11, & 14
2	Beanhole/ Buffalo Tank	2.0	T37N R5E secs. 29 & 30
		3.25	T37N R4E secs. 25, 26, & 27
3	Cram/Buffalo Tank	3.75	T37N R5E secs. 25, 26, 27, 28, and sec. line 28&29
4	Buffalo Tank/ House Rock	2.75	T38N R4E secs. 28,29,&30
5	House Rock	1.0	T39N R4E sec. line 31&32
		3.0	T38N R4E sec. lines between 5&6, 7&8, 7&18
6	Cram/Beanhole	1.5	T38N R5E sec. lines 28&29, 32&33
		4.0	T37N R5E sec. lines 4&5, 8&9, 16&17, 20&21
7	Cram	1.5	T37N R5E sec. 10 & 15 NE NE
8	Soap/House Rock	4.0	T38N R4E sec. 10, 15, 22
9	Soap/Beanhole	2.0	T38N R4E sec. 10, 15, 22 along sec lines of 22&27, 23&26, 24&25 T38N R5E secs. 29 & 30
10	House Rock/ Signature Rock	3.5	T39N R3E secs. 25, 26, 27, & 35
11	Signature Rock	1.5	T39N R3E secs. 14 & 22

*Miles of fence modification needed

PA-1f. AGFD will modify the boundary fence between Buffalo Ranch and BLM administered lands by 1986.

HABITAT STUDIES AND MONITORING

Habitat Studies and Monitoring

BS-2a. Collect and analyze fecal data to determine forage overlap and competition between livestock and bighorn sheep.

BS-2b. Define key sheep use areas by collecting sheep habitat use data to determine those areas that must be protected and those areas requiring less protection.

BS-2c. Establish three study exclosures to be monitored and evaluated in conjunction with the range monitoring program. An exclosure will be built in Hacks Canyon, Paria Canyon, and on the Paria Canyon rim between the Hole and Bush Head.

MD-2a. Collect and analyze fecal data on a seasonal basis for mule deer, cattle, horses, and bighorn sheep to determine forage overlap and competition. A summary will be included in the yearly HMP evaluation report.

MD-2b. By fiscal year 1986 select key areas in summer and winter range to establish deer pellet plots in conjunction with habitat utilization and trend plots.

PA-2a. BLM personnel will collect the appropriate range utilization and trend data to be used in evaluating the relationships between range or habitat condition and population trends.

PA-2b. Collect and analyze fecal data for livestock and antelope on a seasonal basis.

NF-1c. Monitor water quality of the Paria River annually to detect changes. Two sampling stations (Lee's Ferry and Paria Canyon Ranger Station) should be established for early spring collection. The following parameters should be monitored: water temperature (°c), turbidity (JTU), conductivity @ 25°c (WMho/cm), dissolved oxygen (mg/l), PH(su), total alkalinity (mg/l as $Ca(O_3)$, total hardness (mg/l as $Ca(O_3)$, sulfate (mg/l), total dissolved solids (mg/l), and suspended sediment (mg/l).

NF-1d. Summarize flow data from Lee's Ferry and Kanab Creek gauging stations annually (HMP evaluation phase) and evaluate flows of the Lee's Ferry station in regards to native fish requirements.

BP-1a. Continue to monitor peregrine falcon and bald eagle nesting and winter roost habitats through annual aerial and ground surveys. Identify important nesting and wintering habitats and determine distribution, abundance, nest site selection, and population status.

BP-1b. Monitor range conditions near peregrine falcon and bald eagle wintering and nesting habitat. The identification of monitoring areas will be based on distribution surveys (Paria Canyon, Paria Plateau, and Kanab Creek). Biologists will examine range trend and utilization information and make periodic on-the-ground inspections.

NG-1a. Monitor reproduction of deciduous trees in riparian and spring habitats to determine if essential food resources and nesting habitat for nongame birds are being provided for. Key areas are Bush Head, Wrather, Paria, and Kanab Creek Canyons, Soap Creek, Badger Creek, and Cottonwood Spring.

NG-1b. Inventory and monitor ponderosa pine habitat on the Paria Plateau to determine if adequate recruitment of stands is occurring. The location of six of the major stands are listed below.

PONDEROSA PINE DISTRIBUTION--PARIA PLATEAU

AREA	LOCATION	NO. OF TREES
Soap Reservoir	T39N R6E Sec. 9 SW1/4 Sec. 16 NW1/4	40-50
Shed Valley Res.	T40N R6E Sec. 23 SW NE1/4	20-30
Sand Spring	T41N R4E Sec. 6 E1/2 W1/2	40-50
Hole-in-the-Rock Spr.	T41N R4E Sec. 6 NW NE1/4	15-20
Badger Tank	T39N R4E Sec. 2 SW1/4	30-40
Badger Point	T40N R6E Sec. 36 SW1/4	20-30

NG-1c. Monitor structure and cover changes on the Signature Rock AMP and the resultant impact on nongame bird habitat. Permanent vegetative transects will be established in each pasture to detect changes.

NG-1d. Continue to document all sightings of sensitive and unique species of nongame birds.

RSHM-1a. Monitor all springs for changes in habitat condition, water availability, and wildlife accessibility. The following springs will be monitored on a continuous basis. Information will be documented in annual HMP evaluation reports.

SPRING SOURCE	LOCATION
PARIA CANYON SPRINGS	
Wrather Canyon	T41N, R6E, Sec. 8
Bush Head Canyon	T41N, R6E, SE, NE1/4, Sec. 23
Last Spring	T41N, R6E, Sec. 15
Unnamed Spring	T41N, R7E, NW1/4, Sec. 34
Wilson Spring	T41N, R7E, SW1/4, Sec. 34
VERMILLION CLIFFS AND BENCH SPRINGS	
Soap Creek Drainage	T39N, R6E, Sec. 21, 29, 20
Badger Creek Spring	T40N, T39N, R6E, Sec. 35, 2
Lowery Spring	T40N, R7E, SW, NE1/4, Sec. 30
Fisher Spring	T40N, R7E, SW, NE1/4, Sec. 16 (state)
Jacob Cliffs Spring (E)	T39N, R5E, SW, NE, NW1/4, Sec. 31
One Mile Spring	T39N, R3E, E1/2, E1/2, SE1/4, Sec. 3 (state)
Cottonwood Spring	T39N, R6E, NE, SW, NW1/4, Sec. 32
COYOTE BUTTES SPRINGS	
Sand Spring	T41N, R4E, E1/2, W1/2, Sec. 6
Hole-in-the-Rock Spring	T41N, R4E, NE1/4, Sec. 6
Top Rock Spring	T41N, R4E, SE, NE, NW1/4, Sec. 7
Cottonwood Spring	T41N, R4E, SW1/4, Sec. 8
KANAB CREEK SPRINGS	
Daves Spring	T36N, R4W, SW, SW1/4, Sec. 30
Bessie Spring	T36N, R4W, SE, SE1/4, Sec. 23
Water Canyon (lower)	T38N, R3W, NW, SW1/4, Sec. 4
Water Canyon (upper)	T38N, R3W, N1/2, S1/2, Sec. 5

RSHM-1b. Monitor the habitat condition of the Paria Canyon and Kanab Creek riparian zones on an annual basis. When livestock leave the pasture, an inspection of range conditions will be made. A memorandum to the file will be prepared for each area as a method of documentation. The lower (grazed) sections of the Paria Canyon and the Clearwater Spring area of Kanab Creek will be the inspection areas. Glen Canyon National Recreation Area personnel will be invited to participate in range and riparian monitoring within Paria Canyon.

SPECIES

MANAGEMENT

Species Management

BS-1a. AGFD will reintroduce bighorn sheep to the Paria Habitat Area by 1985.

BS-1b. AGFD will reintroduce bighorn sheep to Hacks Canyon by 1989. This planned action will be delayed until such time as existing conflicts are resolved. The BLM and AGFD will annually re-evaluate the existing conflicts to determine the feasibility of proceeding with this planned action (see DR #AZ-010-83-51 on page 108). BLM will coordinate with interested publics, i.e. Energy Fuels Nuclear (EFN) and affected grazing permittees during the re-evaluation process.

BS-1f. AGFD will conduct sheep population monitoring as needed to determine the success of the reestablishment program.

MD-1e. AGFD will continue to annually conduct surveys to identify trends, sex ratios, and fawn survival. The information will be used as an indicator of how well deer populations are responding to intensified habitat management. Additional objectives or modifications of existing ones may result from the studies. BLM will cooperate in the studies as requested.

MD-4. AGFD will conduct surveys to determine winter deer movement in the lower Kanab Creek Canyon and rims as manpower and funding permits.

PA-1a. AGFD will transplant more antelope to either House Rock Valley or the Buffalo Ranch as funding and animals are provided.

PA-1b. As manpower and funding permit AGFD will conduct yearly surveys to obtain population estimates and structure to be used in evaluating the HMP objectives. BLM will collect incidental sightings and will assist AGFD personnel upon request if manpower and funding permit.

NF-1e. Encourage the documentation of life history and habitat requirements of the following species: Rhinichthys osculus (speckled dace), Catostomus latipinnis (flannelmouth sucker), Pantosteus discobolus (Bluehead mountain sucker), Xyrauchen texanus (razorback sucker).

NF-1f. Every 3-5 years resample the 15 established sampling stations to determine the population condition and trend of native fishes and to check for the occurrence of exotic fish species. BLM will participate as requested by AGFD.

CRV-1a. Document the distribution and occurrence of carnivores by habitat preference. The occurrence of kit fox, red fox, raccoon, striped and spotted skunks, ring-tailed cat, and long-tailed weasel needs to be determined in the HMP area.

BLM will continue to record all sightings of these furbearers in support of the documentation effort.

CRV-1b. Gather and analyze predator harvest data and Fish and Wildlife Service (FWS) predator control information to determine the size and value of fur harvests (cooperative effort between AGFD, BLM, and FWS).

NG-1e. Determine the habitat occurrence, distribution, and basic requirements of the following selected species:

a. Desert Shrew (Notiosorex crawfordi)

b. Spotted Bat (Euderma maculata)

c. Desert Pocket Mouse (Perognathus penicillatus)

d. Great Basin Pocket Mouse (Perognathus parvus)

e. Merriam's Kangaroo Rat (Dipodomys merriami)

f. Chisel-toothed Kangaroo Rat (Dipodomys microps)

g. Short-tailed Grasshopper Mouse (Onychomys leucogaster)

h. Bushy-tailed Wood Rat (Neotoma cinerea)

i. Montane Vole (Microtus montanus)

j. Long-tailed Vole (Microtus longicaudus)

k. Desert Kangaroo Rat (Dipodomys deserti)

The dune complexes at the mouth of the Paria Canyon above Wilson Spring and next to Sand Spring in the Coyote Buttes area should be surveyed for habitat occurrence of small mammals (Heteromyid species) and reptiles.

Wrather Canyon, Bush Head Canyon, Soap Creek, Badger Creek, Sand Spring, and Clearwater Spring should be surveyed for habitat occurrence of Sorex spp. and Microtus spp.

NG-1f. Encourage the documentation of nongame bird habitats by AGFD and various universities to determine species distribution, occurrence, and habitat requirements. Sensitive species listed below should receive special attention. Of particular interest is the cattail marsh at the mouth of Wrather Canyon, Wrather Canyon itself, and Bush Head Canyon. These areas mentioned above are key areas and should receive special attention.

SENSITIVE NONGAME BIRDS OF THE HMP AREA

BIRD SPECIES	PONDEROSA PINE	RIPARIAN/ WET MEADOW	PINYON-JUNIPER WOODLAND
Common Flicker	X		
Lewis Woodpecker	X		
Hairy Woodpecker	X		
Scrub Jay			X
Pinyon Jay			X
Gray Flycatcher			X
Plain Titmouse			X
Bell's Vireo		X	
Gray Vireo			X
Blue Grosbeak		X	
Black-headed Grosbeak		X	
Yellow Warbler		X	
Northern Oriole		X	
Summer Tanager		X	
Abet's Towhee		X	
White-breasted Nuthatch	X		
Pygmy Nuthatch	X		
Western Bluebird	X		
Gray-headed Junco	X		

NG-1g. Determine the habitat occurrence, distribution, and basic habitat requirements of the following selected species of herptofauna:

a. Black-tailed Rattlesnake (Crotalus molossus molossus)
b. Grand Canyon Rattlesnake (Crotalus viridis abyssus)
c. Gila Monster (Heloderma suspectum)
d. Southwestern Toad (Bufo microscaphus)
e. Great Plains Toad (Bufo cognatus)
f. Canyon Tree Frog (Hyla arenicolor)
g. Western Skink (Eumeces skiltonianus)
h. Many-lined Skink (Eumeces multivirgatus)
i. Sonoran Lyre Snake (Trimorphodon lambda)
j. Chuckwalla (Sauromalus obesus)
k. Sonoran Mountain Kingsnake (Lampropeltis pyromelana)
l. Banded Gecko (Coleonyx variegatus)
m. Desert Spiny (Sceloporus magister)
n. Plateau Lizard (Sceloporus undulatus)
o. Lesser Earless Lizard (Holbrookia maculata)
p. Milk Snake (Lampropeltis triangulum)

RIPARIAN AND SPRING HABITAT MANAGEMENT

RSHM-1c. Rehabilitate the wet meadow environments by fencing the following springs.

SPRING SOURCE	LOCATION	RECOMMENDED ACTION
Wilson Spring	T41N R7E SW1/4 Sec. 34	Fence immediate area to include cottonwood stands. Assist in developing Lee's Ferry AMP.
Soap Creek Spring (lower source)	T39N R6E NW SW1/4 Sec. 21	Fence major wet meadow areas that are in a deteriorated condition.
Fisher Spring	T40N R7E (state) SW NE1/4 Sec. 16	Drift fence draw below spring.

RSHM-1d. Build study exclosures in Paria Canyon to determine the natural rate of cottonwood and willow reproduction and to assist in the monitoring of local range conditions.

RSHM-1e. Develop an operational plan for riparian and spring habitats to implement a cottonwood-willow planting program. Tentative areas for a pilot planting program are lower sections of Paria Canyon, Clearwater Spring, Kanab Creek, Soap Creek Spring, Badger Creek Spring, Lowery Spring, and Fisher Spring. Trees will be planted so as not to change the visual character of Paria Canyon.

RSHM-1f. Discourage the development or redevelopment of springs that would decrease wet meadow habitat and significantly alter wildlife water distribution. Areas of special concern are Soap Creek Spring, Badger Creek Spring, Cottonwood Spring (Vermillion Bench), Fisher Spring, Sand Spring, Hole-in-the-Rock Spring, Top Rock Spring, Cottonwood Spring

(Coyote Buttes), Gramma Spring, Water Canyon Spring, Bessie Spring, Daves Spring, Johnson Spring, and Coyote Spring.

The development of all springs in Paria Canyon should be discouraged except for those needed for AMP and HMP implementation and recreational use.

RSHM-1g. Encourage the continued reading of hiker impact plots by wilderness and recreation specialists.

RSHM-1h. Support the establishment of a hiker carrying capacity for the canyon once sufficient data has been collected.

RSHM-1i, NG-1h, and BP-1c. Rehabilitate and expand broadleaf riparian habitat through the planting of native species. Ensure stand densities are designed to attract nongame birds and potentially provide suitable nesting and foraging habitat for Cooper's hawk, black hawk, spotted owl, peregrine falcon, and bald eagle. The density and distribution of rehabilitated stands and the establishment of new ones must conform to overall resource objectives and not alter the visual character of Paria Canyon. Refer to the habitat analysis for specific stand criteria.

RSHM-2. Document all springs listed below. Thoroughly inventory each spring, using the District Spring Inventory Card. Take water samples and photographs at each spring site.

SPRINGS REQUIRING FIELD DOCUMENTATION

SOURCE	LOCATION
One Mile/House Rock Springs	T39N R3E, E1/2, E1/2, SE1/4, Sec. 3 (state)
Banal Spring	T39N R4E, SE, SE, SW, Sec. 22
Spring	T39N R4E, NE, NW1/4, Sec. 36
Mill Site Spring	T38N R5E, SW, NW1/4, Sec. 5 (private)
Sunset Spring	T38N R5E, SE, SW1/4, Sec. 6
Seep	T38N R5E, SW, SW1/4, Sec. 1
Spring	T39N R6E, NW, SW1/4, Sec. 30
Spring	T39N R6E, SE, NW1/4, Sec. 29
Seep	T39N R6E, NE, NE, NE1/4, Sec. 29
Seep (two possible sources)	T39N R6E, E1/2, Sec. 19
Seep	T39N R6E, SW, SE1/4, Sec. 20
Spring (in canyon)	T39N R6E, Sec. 10 (NE of Soap Creek Point)
Seep	T36N R6E, NE, NE, SW1/4, Sec. 2
Seep	T39N R6E, N1/2, SW, NE1/4, Sec. 2
Spring	T40N R6E, NW, SE1/4, Sec. 36
Spring	T40N R6E, SE, NE1/4, Sec. 36

LIVESTOCK GRAZING MANAGEMENT

Livestock Grazing Management

BS-1g. Discourage the development of new livestock waters within 2 miles of the Paria Canyon, the Vermillion Cliffs, the rims of Grama and Hacks Canyons, and Kanab Creek rim south of Grama Point.

BS-1h. Determine if livestock-bighorn sheep conflicts occur and resolve the conflicts under multiple-use guidance. Modify existing livestock season of use or grazing systems where conflicts arise between livestock and bighorn sheep.

BS-1i. Discourage the extension of livestock use on the Vermillion Bench from what now occurs, except on Lees Ferry allotment which is being managed differently to protect riparian vegetation along the Paria River.

BS-1j. If utilization and trend studies show an allotment to be eligible for an increase in livestock AUMs in bighorn sheep habitat, the needs of bighorn sheep should be considered to determine if an increase is justified or how much of an increase should be given.

BS-1k. Encourage moderate utilization levels on cool season grasses in bighorn sheep habitat.

MD-1f. If feasible, all strategically placed water facilities should be left on yearlong for mule deer use.

PA-1c. If feasible all strategically placed water facilities should be left on yearlong for antelope use. BLM will work with the individual permittee on a case-by-case basis to resolve any technical problems.

PA-1g. Encourage the implementation of grazing systems and the HMP to improve overall range and habitat condition. Implementation of the HMP and AMPs, however, will depend upon manpower and funding.

NF-1g. Determine the effect of livestock grazing on aquatic habitat condition and trend and how it relates to the native fishes of the Paria River. Planned actions RSHM-1b, NG-1a, and NF-1f will provide information necessary to complete this planned action.

BP-1d. Maintain good range conditions within 1 mile above and below cliff habitat listed below. Areas of concern are Hacks and Gramma Canyons and the lower sections of Paria Canyon. Good range conditions along the rim of the Paria Plateau should also be maintained. Extension of livestock grazing pressure along the Paria Plateau cliff rims should be discouraged. Periodic on-the-ground inspections will be made on important cliff nesting areas to determine range and habitat conditions.

IMPORTANT NESTING AREAS	LINEAR MILES OF CLIFFS
Wilson	7.0
Thousand Pockets	8.0
Bush Head	6.5
Wrather	7.0
Cedar Mountain	7.5
Narrows	24.0
Cedar (Navajo formation)	7.0
Inner Canyon	4.0
Vermillion Cliffs (upper)	37.0
Vermillion Cliffs (bench)	17.0
Hacks Canyon (Robinson and Water Canyons)	37.0
Gramma Canyon	20.5
Kanab Creek (main canyon)	49.5
Shinarump Cliffs (south of Kanab, Utah)	6.0
TOTAL	238.0

BP-1e. Maintain and where needed improve range conditions of riparian and semi-riparian habitats. Ensure that the following areas have adequate nest structures and food resources: Kanab Creek, Paria Canyon, and Vermillion Bench.

NG-1i. Encourage light to moderate livestock utilization (20-60 percent) of herbaceous and shrub communities. Initiate deferred and rest-rotation grazing systems to provide suitable food and nesting habitat for 24 species of nongame birds. Potential problem areas include Hacks and Gramma Canyons and the lower sections of Paria Canyon.

NG-1j. Maintain suitable food resources and nesting habitat for nongame birds within the pinyon-juniper woodlands, riparian, and wet meadow habitats. Allotment trend and utilization data will be reviewed annually to monitor NG-1j.

NG-1k. Upgrade habitat conditions (food and cover) of deteriorated areas in Hack and Gramma Canyons and the lower sections of Paria Canyon. Biologists will review trend and utilization data annually.

NG-1l. Provide suitable habitat conditions near cliff and canyon areas (refer to birds of prey section for location). After established chiropteran roosts and hibernacula are located, specific areas may be focused on.

NG-1m. Maintain and upgrade riparian and spring environments by monitoring livestock grazing pressure of key areas to provide suitable habitat conditions for bats and small mammals.

NG-1n. Improve herbaceous cover, diversity, and density in canyon and wash habitats through intensive livestock management. Areas of concern include Water, Gramma, and Hacks Canyons and lower reaches of Paria Canyon. Perennial grass and forb utilization will be determined by reviewing allotment range studies.

NG-1o. Maintain current range conditions on BLM administered lands in Paria Canyon and Vermillion Cliffs rims and foothills, Daves, Chamberlain, and Dripping Springs Canyons, and the west Kanab Creek rim and Coyote Buttes area.

NG-1p. Maintain riparian habitat in key areas to ensure amphibian survival (breeding) by reducing soil compaction and maintaining water quality and quantity and wet meadow vegetation. Key areas are Badger Creek, Soap Creek, Wrather Canyon, Bush Head Canyon, Paria Canyon, Sand Spring, and Kanab Creek. Rehabilitate Wilson Spring and lower sections of Soap Creek by fencing wet meadow areas.

Alpine. Maintain the surface [illegible] influenced by [illegible] livestock grazing practices of past years, to preserve suitable habitat, quality of the [illegible] and small mammals.

Aspen. Maintain herbaceous cover, diversity, and density in canyon and rock outcrops through intensive livestock management. Areas of suitable [illegible] browse and lower reaches of [illegible], [illegible] and [illegible] utilization will be determined by evaluating allotment range condition.

[illegible]. Maintain current range conditions on the [illegible] Canyon and [illegible] Creek, [illegible] Spring [illegible], and the [illegible] area.

[illegible]. Maintain riparian habitat in the areas to provide [illegible] by [illegible] and [illegible] and [illegible].

VEGETATION TREATMENTS

Vegetative Treatments

MD-1j. Contribute wildlife funds towards implementing the 1,200-acre Coyote allotment land treatment planned in T41N R3E Secs. 17, 18, 19, 24, 25, and 30.

MD-1k. Create deer forage patches of 20 to 50 acres each in the Buckskins by treating sage flats and pinyon-juniper.

MD-1l. On an experimental basis, use prescribed burns to reduce pinyon-juniper overstory where Gambel oak growth is suppressed.

MD-1m. Contribute funding on an annual basis to the acquisition of desirable seed or planting stock for deer to be included in range improvement projects. The seed purchased is to supplement the normal seed mixture included in seeding projects.

BP-2a. Maintain adequate Cooper's hawk nesting habitat in the pinyon-juniper woodland on the Paria Plateau and Buckskin Mountains and other areas with suitable habitat. Mature pinyon-juniper stands with densities of 32 to 68 trees/acre should be retained to provide sufficient accipiter nesting within the immediate project area. Leave large snags as hunting perches within the treatment area. Design land treatment projects to achieve maximum prey abundance.

NG-2a. Use the following recommendations to lessen the impact of land treatments on nongame habitat.

- The average width of treated areas should not exceed 650-850 feet.
- The average length should not exceed 1,220 feet.
- Each treated area should have at least 2-4 islands of 5-10 acres each.
- Ridges should remain untreated and be at least 300 feet wide.
- Cleared areas should be limited to one third of the HMP area. For every 100 acres cleared, 200 acres should remain untreated.
- Openings should be small and irregularly shaped to create the most amount of edge.
- Islands of high density pinyon pines (2-3 pinyon:1 juniper) should be left in treated areas.
- Brush piles should be evenly distributed over the treated area to provide adequate cover.
- Enough litter should be maintained in treated habitats to provide adequate cover sites.

NG-2b. Encourage the retention of predominantly pinyon pine habitat (usually above 6,000-foot elevations) within the pinyon-juniper woodland on the Paria Plateau and Buckskin Mountains.

NG-3a. On commercial woodcutting areas, require that 2-3 large pinyon pine snags or 2-3 pinyons with snag potential per acre be left standing. These areas will be closely monitored for compliance.

NG-3b. Incorporate large pinyon pine snags in islands or untreated areas of vegetation maniuplation projects or leave older-aged islands of live pinyons untreated.

CRITERIA FOR LAND USE AUTHORIZATION

Criteria for Land Use Authorization

BS-1l. Acquire State land within bighorn sheep habitat through land exchange to "block up" public lands for more efficient and coordinated management.

BS-1m. Encourage energy and mining companies to avoid exploratory activities in critical sheep habitat areas during critical times, e.g. lambing grounds during lambing season and watering sites during late spring and early summer.

BS-1n. Prohibit camping within 0.25 miles of sheep waters.

BS-1o. Close lambing grounds to public access during the lambing period if evidence shows that public access may cause undue disturbance and harassment.

MD-1g. The following guidelines should be followed when feasible in designing land treatments larger than 200 acres.

- A 1/8- to 1/4-mile-wide buffer zone should be maintained around water facilities.
- Treatment areas should not exceed 850 feet in width.
- Ridges should remain untreated, and untreated strips should be at least 300 feet wide.
- Islands of untreated land should be left standing.
- Land contours should be followed and irregular edges created.
- Treatment areas should be widely scattered throughout the service area.

MD-1h. The following guidelines should be taken into consideration in planning land treatments and woodland products management.

- To maintain adequate cover, no more than 33 percent of a service area in pinyon-juniper stands should be treated.
- Where pinyon-juniper stands comprise less than 67 percent of the total service area, pinyon-juniper should not be treated.
- Commercial post cutting and firewood collection of live pinyon-juniper trees should be discouraged where pinyon-juniper stands make up less than 67 percent of the total service area.
- Non-commercial post cutting and firewood collection should be closely monitored where pinyon-juniper stands make up less than 67 percent of the total service area.

MD-1i. Closely monitor designated woodland products areas to insure that adequate cover is left for mule deer.

BP-1f. Provide a mile buffer around active nests of peregrine falcon, bald eagle, and golden eagle to prevent nest abandonment because of human disturbance. When appropriate, apply the same buffer to all birds of prey. The critical nesting season runs from March 1 to August 31 for most species.

BP-1g. Ensure all mineral development next to crucial nesting and wintering areas are cleared for T&E birds of prey before entry. Species of concern are the peregrine falcon, bald eagle, and golden eagle. See BP-1a for crucial areas.

BP-1h. Assess visitor use impact in the Paria Canyon Primitive Area on birds of prey nesting. Bush Head and Wrather Canyons may be potential conflict areas.

BP-1i. Discourage increased vehicular access (right-of-ways, pipeline and road construction) to crucial riparian and cliff nesting habitats. If access is needed for a specific project, ensure that roads are rehabilitated. Key areas are those identified as necessary for threatened and endangered species in the narrative.

BP-1j. Discourage land use practices and development that adversely alter or eliminate the character of hunting habitat or prey base within 5 miles of active nest sites and within 1 mile of nesting cliffs of threatened and endangered birds of prey.

BP-2b. Discourage use of pesticides and other environmental pollutants, which are harmful or persistent in the food source for threatened and endangered birds of prey.

NG-4a. Maternity roosts and hibernating bats will not be disturbed.

NG-4b. Care must be taken not to restrict air flow and bat access to roost sites if hazard abatement work is deemed necessary.

IV. EVALUATION AND MONITORING

See forms 6780-2.

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HABITAT MANAGEMENT PLAN PROGRESS REPORT

OBJECTIVES	DATE COMPLETED	PLANNED ACTIONS	DATE COMPLETED	EVALUATION/MONITORING	DATE COMPLETED
BS-1. Re-establish and manage for 175 desert bighorn sheep in the Paria Canyon-Vermillion Bench area by 1995 and 130 sheep in the Hacks Canyon-Kanab Creek area by 2000.		BS-1a. AGFD will reintroduce bighorn sheep to the Paria Habitat Area by 1985.		The AGFD will take responsibility in trapping and releasing bighorn sheep and follow the releases up with surveys to determine their success. BLM may assist as requested by AGFD.	
		BS-1b. AGFD will reintroduce bighorn sheep to Hacks Canyon by 1989.			
		BS-1c. Build (3 wildlife) catchments within the Kanab Creek area.		An EA will be done on each project or a combination of projects that are proposed in WSAs, ISAs, or designated wilderness areas to determine if the projects are compatible with such areas.	
		BS-1d. Modify Kanab Creek deer catchment to enhance it's use by bighorn sheep by piping the water 0.25 miles to the south rim of Chamberlain Canyon.		BLM and AGFD biologists and engineers will conduct project feasibility and inspect project work with contract supervisor.	
		BS-1e. Build (12) water developments in the Paria Area.		Success, availability, and use of the water developments will be monitored on a yearly basis. Areas needing additional water	

INSTRUCTIONS

1. List specific HMP objectives as developed from RMP/MFP planning documents or as otherwise approved.
2. List specific planned actions to be initiated to meet each specific objective.
3. List scheduled evaluation/monitoring study(s) planned to evaluate accomplishments.
4. Enter completion date for each objective, action, or evaluation/monitoring study as accomplished.

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				will be identified. All waters will be inspected yearly with needed maintenance and repairs made.	
		BS-1f. AGFD will conduct sheep population monitoring as needed to determine the success of the reestablishment program.		AGFD will conduct aerial and ground surveys as manpower and funding permits to determine population, health, movement, and important use areas.	
		BS-1g. Discourage the development of new livestock waters within 2 miles of the Paria Canyon, the Vermillion Cliffs, the rims of Grama and Hacks Canyons, and Kanab Creek rim south of Grama Point.		Proposed waters will be evaluated on a case-by-case basis. BLM range and wildlife personnel will make their recommendations to the Area Manager.	
		BS-1h. Determine if livestock-bighorn sheep conflicts occur and resolve the conflicts under multiple-use guidance.		BLM and AGFD biologists will monitor sheep movement and use areas. BLM biologists and range conservationists will conduct range utilization and trend studies for livestock and establish additional vegetative moni-	

INSTRUCTIONS

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2. List specific planned actions to be initiated to meet each specific objective.
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4. Enter completion date for each objective, action, or evaluation/monitoring study as accomplished.

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				toring studies where appropriate.	
				BLM and AGFD personnel will evaluate pertinent information on a case-by-case basis and make recommendations to the Area Manager.	
		BS-1i. Discourage the extension of livestock use on the Vermillion Bench from what now occurs, except on Lee's Ferry allotment,		There are no proposals for extending livestock use on the Vermillion Bench. However if such a proposal is made, BLM and AGFD personnel will evaluate the proposal and make recommendations to the Area Manager.	
		BS-1j. If utilization and trend studies show an allotment to be eligible for an increase in livestock AUMs in bighorn sheep habitat, the needs of bighorn sheep should be considered to determine if an increase is justified or how much of an increase should be given.		Range monitoring studies will be used to evaluate livestock use. BLM wildlife biologists and range conservationists will conduct range monitoring studies together and will establish additional monitoring studies if necessary. BLM and AGFD biologists will make their recommendations to the Area Manger.	

INSTRUCTIONS

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2. List specific planned actions to be initiated to meet each specific objective.
3. List scheduled evaluation/monitoring study(s) planned to evaluate accomplishments.
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		BS-1k. Encourage moderate utilization levels on cool season grasses in bighorn sheep habitat.		Same as above.	
		BS-1l. Acquire State land within bighorn sheep habitat through land exchange to "block up" public lands for more efficient and coordinated management.		These lands will be identified through the ongoing land exchange program. State land in Paria Canyon has been identified in the Paria Recreation Management Plan for exchange already.	
		BS-1m. Encourage energy and mining companies to avoid exploratory activities in critical sheep habitat areas during critical times, e.g. lambing grounds during lambing season and watering sites during late spring and early summer.		AGFD and BLM biologists will identify the critical sheep areas. Each plan of operation will be carefully reviewed and recommendations will be made on a case-by-case basis.	
		BS-1n. Prohibit camping within 0.25 miles of sheep waters.		AGFD and BLM personnel will identify waters used by sheep and make periodic inspections of such waters for	

INSTRUCTIONS

1. List specific HMP objectives as developed from RMP/MFP planning documents or as otherwise approved.
2. List specific planned actions to be initiated to meet each specific objective.
3. List scheduled evaluation/monitoring study(s) planned to evaluate accomplishments.
4. Enter completion date for each objective, action, or evaluation/monitoring study as accomplished.

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OBJECTIVES	DATE COMPLETED	PLANNED ACTIONS	DATE COMPLETED	EVALUATION/MONITORING	DATE COMPLETED
		BS-1o. Close lambing grounds to public access during the lambing period if evidence shows that public access may cause undue disturbance and harassment.		compliance. Lambing grounds will be identified and appropriate action taken such as temporarily closing roads or encouraging backpackers to stay away from lambing grounds.	

INSTRUCTIONS

1. List specific HMP objectives as developed from RMP/MFP planning documents or as otherwise approved.
2. List specific planned actions to be initiated to meet each specific objective.
3. List scheduled evaluation/monitoring study(s) planned to evaluate accomplishments.
4. Enter completion date for each objective, action, or evaluation/monitoring study as accomplished.

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OBJECTIVES	DATE COMPLETED	PLANNED ACTIONS	DATE COMPLETED	EVALUATION/MONITORING	DATE COMPLETED
MD-1. Maintain and where applicable enhance deer habitat in the Buckskins, the Vermillion Cliffs, and the Gunsight area to meet the following objectives by 1990. 1. Increase the resident deer herd from 180 deer (3 deer/section) to 600 deer (10 deer/section) in the Buckskins. 2. Increase the resident deer herd from 60 deer (1 deer/section) to 180 deer (3 deer/section) within the rim area of the Vermillion Cliffs. 3. Increase the resident deer herd from 180 deer (1 deer/section) to 360 deer (2 deer/section) in the Gunsight Point area.		MD-1a. Build (5) water facilities in the habitat management area by 1988. MD-1b. Modify the existing Jim's Catchment to provide storage and trough for deer use. MD-1c. Contribute funding to Soap Tank storage tank and trough to provide reliable water for deer. MD-1d. Contribute funds to help build the Pine Hollow Livestock Catchment on the Buckskins.		BLM biologists and engineer will conduct feasibility studies. Biologists will monitor the use of the water developments and report their completion as they are done on an annual basis in the HMP evaluation progress report. The developments will be inspected yearly and repaired and monitored as necessary.	

INSTRUCTIONS

1. List specific HMP objectives as developed from RMP/MFP planning documents or as otherwise approved.
2. List specific planned actions to be initiated to meet each specific objective.
3. List scheduled evaluation/monitoring study(s) planned to evaluate accomplishments.
4. Enter completion date for each objective, action, or evaluation/monitoring study as accomplished.

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OBJECTIVES	DATE COMPLETED	PLANNED ACTIONS	DATE COMPLETED	EVALUATION/MONITORING	DATE COMPLETED
		MD-1e. AGFD will continue to annually conduct surveys to identify trends, sex ratios, and fawn survival.		The data collected will be used to evaluate the HMP accomplishments and will help to identify problem areas. Information obtained will be incorporated in the annual HMP evaluation and progress report.	
		MD-1f. If feasible, all strategically placed water facilities should be left on yearlong for mule deer use.		BLM personnel will work with the affected livestock operator on a case-by-case basis to insure compliance. Because of technical problems, some waters may be exempt.	
		MD-1g. The following guidelines should be followed when feasible in designing land treatments larger than 200 acres.		The Area Biologist will participate in the location and designing of each land treatment.	
		1. A 1/8 to 1/4-mile-wide buffer zone should be maintained around water facilities.			

INSTRUCTIONS

1. List specific HMP objectives as developed from RMP/MFP planning documents or as otherwise approved.
2. List specific planned actions to be initiated to meet each specific objective.
3. List scheduled evaluation/monitoring study(s) planned to evaluate accomplishments.
4. Enter completion date for each objective, action, or evaluation/monitoring study as accomplished.

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OBJECTIVES	DATE COMPLETED	PLANNED ACTIONS	DATE COMPLETED	EVALUATION/MONITORING	DATE COMPLETED
		2. Treatment areas should not exceed 850 feet in width. 3. Ridges should remain untreated and untreated strips should be at least 300 feet wide. 4. Islands of untreated land should be left standing. 5. Land contours should be followed and irregular edges created. 6. Treatment areas should be widely scattered throughout the service area.			
		MD-1h. The following guidelines should be taken into consideration in planning land treatments and woodland products management.		The Area Biologist will participate in selecting land treatment areas and woodland products areas.	

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U.S. Government Printing Office:1981-780-780/693 Reg 8

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		1. No more than 33 percent of a service area in P-J stands should be treated.			
		2. Where P-J stands comprise less than 67 percent of the total service area, P-J should not be treated.			
		3. Commercial post cutting and firewood collection of live P-J trees should be discouraged where P-J stands make up less than 67 percent of the total service area and non-commercial post cutting and firewood collection should be closely monitored.			
		MD-1i. Closely monitor designated woodland products areas to insure that adequate cover is left for mule deer.		The Area Biologist will be responsible for monitoring the woodland products areas and will make recommendations to the Area Manager when mitigation or closure may be necessary.	

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		MD-1j. Contribute wildlife funds towards implementing the 1,200-acre Coyote allotment land treatment.		The Area Biologist and appropriate Range Conservationist will work together in selecting and designing the land treatment area.	
		MD-1k. Create deer forage patches of 20 to 50 acres each in the Coyote allotment by treating five sage flats.		Vegetation transects will be conducted before and after the land treatments to analyze and document vegetational changes.	
		MD-1l. On an experimental basis, use prescribed burns to reduce pinyon-juniper overstory where Gambel oak growth is suppressed.			
		MD-1m. Contribute funding on an annual basis to the acquisition of desirable seed or planting stock for deer to be included in range improvement projects.		BLM range and wildlife personnel will monitor the range land treatments to see how effective and successful the additional seed mixtures or planting stocks are.	

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MD-2. Determine key forage species for livestock, mule deer, and bighorn sheep and determine the degree of forage competition between these animals by 1988.		MD-2a. Collect and analyze fecal data on a seasonal basis for mule deer, cattle, horses, and bighorn sheep to determine forage overlap and competition.		BLM wildlife personnel will collect fecal data for the analysis. A summary will be included in the yearly HMP evaluation report.	
		MD-2b. By fiscal year 1986, select key areas in summer and winter range to establish deer pellot plots in conjunction with habitat utilization and trend plots.		BLM wildlife personnel will locate the sites and read the pellot plots at least once a year. A summary of the data will be incorporated into the annual HMP evaluation report.	
MD-3. Insure that key waters are available to deer by 1988.		MD-3. Modify the existing fences around the following waters to make them safely available to deer: Coyote Springs Reservoir, Bush Head Stock Tank, Middle Reservoir, Bentonite Reservoir, and Johnson's Spring.		The Area Biologist will work with the appropriate permittee in designing the fence modification to satisfy deer and livestock needs. Additional waterlot fences may be identified for modification if the need arises. The Area Biologist will monitor deer use at these waters to document the effectiveness of the fence modifications.	

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MD-4. Determine the extent of deer movement through and use of lower Kanab Creek Canyon and west rim to analyze the need of habitat improvement projects and potential competition between deer and bighorn sheep by 1986.		MD-4. AGFD will conduct surveys to determine winter deer movement in the lower Kanab Creek Canyon and rims as manpower and funding permits.		AGFD will conduct the surveys as manpower and funding permits. BLM personnel may assist if requested or will record incidental sightings. The data will be incorporated as part of the HMP evaluation report each year.	

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PA-1. Manage antelope and antelope habitat in House Rock Valley to increase fawn survival from 5 fawns/100 does to 25 fawns/100 does by 1988 and for an overall population of 100 antelope by 1990.		PA-1a. AGFD will transplant more antelope to either House Rock Valley or Buffalo Ranch as funding and animals are provided.		Both planned actions will be conducted by AGFD personnel. BLM may provide manpower assistance if so requested. Survey data will be incorporated in annual HMP evaluation report.	
		PA-1b. As manpower and funding permit, AGFD will conduct yearly surveys to obtain population estimates and structure to be used in evaluating the HMP objectives.			
		Pa-1c. If feasible, all strategically placed water facilities should be left on yearlong for antelope use.		BLM range and wildlife personnel will work with permittees to comply with this action where feasible.	
		PA-1d. Improve water distribution, reliability, and availability so that all areas of antelope habitat lie within 3 miles of water by 1988.		BLM wildlife, range, and engineering personnel will conduct feasibility studies on the design and location of the proposed projects. Documentation of the project will be made in the JDR file and HMP evaluation report. AGFD and BLM wildlife personnel will monitor antelope use of the waters.	

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		PA-1e. Forty miles of range fences will be modified by 1988.		Documentation of the completion of each year's fence modification will be made in the annual HMP evaluation report.	
		PA-1f. AGFD will modify the boundary fence between Buffalo Ranch and BLM administered lands by 1986.		Same as above.	
		PA-1g. Encourage the implementation of grazing systems and the HMP to improve overall range and habitat condition.		BLM wildlife and range personnel will cooperate in reading range utilization and trend studies to determine effectiveness of the AMPs and HMP. The analysis will be documented in the annual HMP evaluation report.	
PA-2. Determine key forage species for livestock and antelope and document the relative use of forage by each within House Rock Valley by 1986.		PA-2a. BLM personnel will collect the appropriate range utilization and trend data to be used in evaluating the relationship between range or habitat condition and population trends.		BLM will use this data in conjunction with antelope population data furnished by AGFD to determine if the AMPs and HMP are working.	

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		PA-2b. Collect and analyze fecal data for livestock and antelope on a seasonal basis.		Same as above.	

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OBJECTIVES	DATE COMPLETED	PLANNED ACTIONS	DATE COMPLETED	EVALUATION/MONITORING	DATE COMPLETED
UG-1. Improve chukar habitat and increase hunting opportunities by 1986.		UG-1. Build a chukar water with a 500-gallon storage capacity at the head of Gunsight Canyon and monitor the use of the water to determine if other chukar waters would be desirable.		BLM and AGFD wildlife biologists in conjunction with BLM engineer will locate the site and insure that the location and design is feasible. Personnel from both agencies will conduct spot inspections of the water to document chukar use.	

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NF-1. Maintain and where necessary improve aquatic and riparian habitat condition of 36 miles of the Paria River in order to sustain viable populations of speckled dace, flannelmouth sucker, blue-head mountain sucker, and razorback sucker.	As required	NF-1a. Discourage any further diversion or impoundment of the Paria River, which would significantly change flows and water quality critical to native fish fauna.	As required	AGFD and BLM biologists will evaluate and make recommendations on any proposals which will involve diversion or impoundment of waters in the Paria River drainage.	As required
	As required	NF-1b. Support the acquisition of lands along the Paria River as identified in the Paria Canyon Recreation Management Plan and keep all aquatic habitat now in public ownership in Paria Canyon and Kanab Creek drainage.	As required	AGFD and BLM biologists will monitor progress of Paria Canyon's Recreation Management Plan and review all actions involving disposal or exchange of lands in the Paria River and Kanab Creek drainages in Arizona.	As required
	Annually	NF-1c. Monitor water quality of Paria River annually to detect changes. Two sampling stations are to be established for early spring collection. See planned action for parameters to be measured.	Annually	AGFD and BLM biologists will collect samples annually and evaluate data each year through the HMP evaluation report. Samples will be analyzed by AGFD.	Annually
				Flow data from both gauging stations will be included	Annually

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				in annual HMP evaluations. AGFD will evaluate flow data for Lee's Ferry station in regards to flow requirements of native fishes.	
		NF-1d. Summarize flow data from Lee's Ferry and Kanab Creek gauging stations annually (HMP evaluation phase) and evaluate flows of the Lee's Ferry station in regard to native fish requirements.	Annually	Support research conducted by AGFD, universities, or other interested parties which will provide information on the mentioned species of fish. Compile information on these species as it becomes available.	As necessary
		NF-1e. Encourage the documentation of life history and habitat requirements of the following species: Rhinichthys osculus (speckled dace) Catostomus latipinnis (flannelmouth sucker) Pantosteus discobolus (blue-head mountain sucker) Xyrauchen texanus (razorback sucker)			

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		NF-1f. Every 3-5 years re-sample the 15 established sampling stations to determine the population condition and trend of native fishes and to check for the occurrence of exotic fish species.	Every 3-5 years	AGFD biologists will re-sample the 15 established sampling stations every 3-5 years. BLM will participate as requested by AGFD.	Every 3-5 years
		NF-1g. Determine the effect of livestock grazing on aquatic habitat condition and trend and how it relates to native fishes of the Paria River.		AGFD and BLM biologists will determine aquatic habitat condition and trend and its effect on native fishes of the Paria River.	
NF-2. Ensure a native fish fauna is maintained in the Paria River drainage	As required	NF-2. AGFD will deny stocking requests for exotic fish species in the Paria River drainage.	As required	AGFD biologist will review all stocking requests for the Paria River drainage in Arizona.	As required

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BP-1. Provide for the biological and habitat requirements (suitable nesting and food resources) of all birds of prey especially those protected by the Bald Eagle Protection Act and the ESA in relation to other resource programs involving habitat alteration and human disturbance.		BP-1a. Continue to monitor peregrine falcon and bald eagle nesting and winter roost habitats through annual aerial and ground surveys. Identify important nesting and wintering habitats and determine distribution, abundance, nest site selection, and population status.	Annually	Each year BLM and AGFD biologists will survey existing nest sites and identify new nesting areas. Wintering habitats will be documented and all sightings recorded.	Annually
	Ongoing	BP-1b. Monitor range conditions within the vicinity of peregrine falcon and bald eagle wintering and nesting habitat. The identification of monitoring areas will be based on distribution surveys (Paria Canyon, Paria Plateau, and Kanab Creek).	Annually	BLM biologists will examine allotment trend and utilization informaiton within the vicinity of nests and make periodic on-the-ground inspections of range conditions. Data will be included in annual HMP evaluation.	Annually
		BP-1c. Rehabilitate and expand broadleaf riparian habitat through the planting of native species. Ensure stand densities are		Recommended stand size and densities will be evaluated in future years to determine the benefit to birds of prey.	

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		designed to attract nongame birds and potentially provide suitable nesting and foraging habitat for Cooper's hawk, black hawk, spotted owl, peregrine falcon, and bald eagle. The density and distribution of rehabilitated stands and the establishment of new ones must conform to overall resource objectives and not alter the visual character of Paria Canyon. Refer to the habitat analysis for specific stand criteria.			
		BP-1d. Maintain good range conditions within 1 mile above and below identified cliff habitats (see planned actions for crucial habitat). Areas of concern are Hacks and Gramma Canyons and the lower sections of Paria Canyon. Good range conditions along the rim of the	Annually	Allotment trend and utilization studies adjacent to cliff habitats will be reviewed annually by BLM biologists. Proposals for extension of livestock water developments in these areas will be jointly reviewed by AGFD and BLM biologists on a case-by-case basis.	Annually

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		Paria Plateau should also be maintained. Extension of livestock grazing pressure along the Paria Cliff rims should be discouraged.			
		BP-1e. Maintain and where needed improve range conditions of riparian and semiriparian habitats. Ensure that the following areas have adequate nest structures and food resources: Kanab Creek, Paria Canyon, and Vermillion Bench.	Annually	Assess available birds of prey nest structures and quality of food resources in riparian and semi-riparian habitats. BLM biologists will attempt to provide optimum nesting habitat.	Annaully
		BP-1f. Provide a 1 mile buffer around active nests of peregrine falcon, bald eagle, and golden eagle to prevent nest abandonment because of human disturbance. When appropriate apply the same buffer to all birds of prey. The critical nesting season runs from March 1 to August 31 for most species.	Annually	BLM biologists will field check all land use proposals to ensure nest abandonment is prevented. Peregrine falcon, bald eagle, and golden eagle will receive special attention.	Annually

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		BP-1g. Ensure all mineral development next to crucial nesting and wintering areas are cleared for T&E birds of prey before entry.	Annually	Same as above.	Annually
		BP-1h. Assess visitor use impact in the Paria Canyon Primitive Area on birds of prey nesting. Bush Head and Wrather Canyons may be potential conflict areas.	Annually	Monitor peregrine falcon and Cooper's hawk nesting activities at various times during the nesting season. BLM and AGFD biologists will evaluate juxtaposition of nest in relation to human disturbance.	Annually
		BP-1i. Discourage increased vehicular access (rights-of-way, pipelines, and road construction) to crucial riparian and cliff nesting habitats. If access is needed for a specific project ensure that roads are rehabilitated. Key areas are those identified necessary for T&E species in narrative.	Annually	BLM and AGFD will review all requests which propose increased access to these crucial nesting areas. Recommendations will be made to reduce or remove impacts.	Annually

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		BP-1j. Discourage land use practices and development that adversely alter or eliminate the character of hunting habitat or prey base within 5 miles of nest sites and within 1 mile of nesting cliffs of T&E birds of prey.	Annually	BLM biologists will follow District guidelines regarding formal and informal Section 7 consultation.	Annually
BP-2. Provide for the habitat needs of birds of prey in vegetative treatment projects.		BP-2a. Maintain adequate Cooper's hawk nesting habitat in the pinyon-juniper woodland on the Paria Plateau, Buckskin Mountians, and other areas with suitable habitat. Mature pinyon-juniper stands with densities of 32 to 68 trees/acre should be retained to provide sufficient accipiter nesting within immediate project area. Design land treatment to achieve maximum prey abundance.		Land treatment projects should be evaluated by BLM biologists to ensure adequate Cooper's hawk nesting habitat is retained within the immediate project area. Stocking levels of 32 to 68 trees/acre should be used as a guide to identify suitable areas.	
		BP-2b. Discourage use of pesticides and other environmental pollutants which are harmful or persistent in the food source for T&E birds of prey.		Same as above.	

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CRV-1. Maintain, improve, and monitor carnivore habitat and harvests to ensure a healthy and diverse predator component throughout the habitat area. Unique and sensitive furbearers should receive special attention.		CRV-1a. Document the distribution and occurrence of carnivores by habitat preference. The occurrence of kit fox, red fox, raccoon, striped and spotted skunks, ring-tailed and long-tailed weasel needs to be determined in the HMP area. BLM will continue to record all sightings of these furbearers in support of the documentation effort.		AGFD and BLM biologists will continue to record all sightings of these furbearers. AGFD personnel will interview trappers and local citizens for information on occurrence.	
		CRV-1b. Gather and analyze predator harvest and Fish and Wildlife Service (FWS) predator control information to determine the size and value of fur harvests.		AGFD biologists will take the lead on this planned action, however, BLM and FWS will assist as requested. Annually the number of each species removed according to general location will be analyzed along with the economic value of the fur harvest. Data will be included in annual HMP evaluations.	

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NG-1. Provide for the habitat needs (food, cover, nesting, and breeding resources) for nongame birds, small mammals, bats, amphibians, and reptiles through the maintenance and where necessary the enhancement of existing habitat conditions.	Annually	NG-1a. Monitor reproduction of deciduous trees in riparian and spring habitats to determine essential food resources and nesting habitat for nongame birds are being provided for.	Annually	Evaluate annually cottonwood, willow, and box elder reproduction in Bush Head, Wrather, Paria, and Kanab Creek Canyons, Soap Creek, Badger Creek, and Cottonwood Spring. Summarize information in yearly HMP evaluations.	
		NG-1b. Inventory and monitor ponderosa pine habitat on the Paria Plateau to determine if adequate recruitment of stands is occurring. See planned action section for major stand locations.	Periodically	Ponderosa stands will be mapped, rates of recruitment established and periodically monitored. BLM biologists will accomplish this planned action.	Periodically
		NG-1c. Monitor structure and cover changes on the Signature Rock AMP and the resultant impact on nongame bird habitat.		Permanent vegetative structure transects will be established in each pasture to detect changes in nongame bird nesting cover. The results of the study will be analyzed to determine the effects of SGM on the breeding avifauna. AGFD and	

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				BLM biologists will jointly read and evaluate transect data.	
		NG-1d. Continue to document all sightings of sensitive and unique species of nongame birds.		Record all sightings of sensitive and unique species in district files.	
		NG-1e. AGFD will determine the habitat occurrence, distribution, and basic requirements of selected species of small mammals and bats. Refer to planned actions section for listing of species.		Small mammal and bat surveys will be conducted by AGFD biologists. BLM personnel will assist as requested by AGFD.	
		NG-1f. Encourage the documentation of nongame bird habitats by AGFD and various universities to determine species distribution, occurrence, and habitat requirements. Key areas and selected speceis are listed in planned action section.		Literature on selected species will be compiled and BLM will support efforts by other interested parties to collect needed information.	

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		NG-1g. AGFD will determine the habitat occurrence, distribution, and basic habitat requirements of selected species of herpetofauna. See planned actions section for species list.		Amphibian and reptile surveys will be accomplished by AGFD biologists. Participation of BLM personnel will be at the request of AGFD.	
		NG-1h. See BP-1c.		See BP-1c.	
		NG-1i. Encourage light to moderate livestock utilization (20-60 percent) of herbaceous and shrub communities. Initiate deferred and rest rotation grazing systems.		BLM biologists will review allotment trend and utilization data annually. The use of rest rotation and deferred rotation grazing systems will be encouraged.	
		NG-1j. Maintain suitable food resources and nesting habitat for nongame birds within the pinyon-juniper woodlands, riparian and wet meadow habitats.		Same as above.	
		NG-1k. Upgrade habitat conditions (food and cover) of deteriorate areas in Hack and Gramma Canyons and the		Same as above.	

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		lower sections of Paria Canyon. Biologists will review trend and utilization data annually.			
		NG-1l. Provide suitable habitat conditions near cliff and canyon areas (refer to birds of prey section for location). After established chiropteran roosts and hibernacula are located, specific areas may be focused on.		Same as above.	
		NG-1m. Maintain and upgrade riparian and spring environments by monitoring livestock grazing pressure of key areas to provide suitable habitat conditions for bats and small mammals.		Same as above.	
		NG-1n. Improve low height cover, diversity, and density of perennial grasses and forbs in canyon and wash habitats through intensive livestock management. Areas		BLM biologists will analyze perennial grass and forb trend and utilization of various allotments associated with canyon and wash habitats. If trend and util-	

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		of concern include Water, Gramma, and Hacks Canyons and the lower reaches of Paria Canyon.		ization plots do not reflect canyon and wash habitat condition additional plots will then be summarized in annual HMP evaluations.	
		NG-1o. Maintain current range conditions on BLM administered lands in Paria Canyon and Vermillion Cliffs rims and foothills, Daves, Chamberlain, and Dripping Springs Canyons, and the west Kanab Creek rim and Coyote Buttes area.		Same as above.	
		NG-1p. Maintain riparian habitat in key areas to ensure amphibian survival (breeding) by reducing soil compaction and maintaining water quality and quantity and wet meadow vegetation. Key areas are Badger Creek, Soap Creek, Wrather Canyon, Bush Head Canyon, Paria Canyon, Sand Spring, and Kanab Creek. Rehabilitate		BLM and AGFD biologists should review all proposals for development or redevelopment of spring sources on a case-by-case basis and recommend that sufficient water remain at the source to ensure adequate breeding habitat. Key areas should receive special attention to maintain existing breeding habitat. All spring modification pro-	

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		Wilson Spring and lower sections of Soap Creek by fencing wet meadow areas.		posals should be summarized in yearly HMP evaluation.	
NG-2. Maintain adequate habitat for nongame populations in the immediate area of vegetation manipulation projects and minimize the impact of treated areas through proper mitigation measures.		NG-2a. Use the recommendations outlined in the planned action section to lessen the impact of land treatments on nongame habitat.		AGFD and BLM biologists will review all land treatment proposals. All reviews will be documented in annual HMP evaluations.	
		NG-2b. Encourage the retention of predominately pinyon pine habitat (usually above 6,00-foot elevations) within the pinyon-juniper woodland on the Paria Plateau and Buckskin Mountains.		During the development of land treatment projects BLM biologist should discourage the inclusion of these predominately pinyon pine habitats as part of the treatment area.	
NG-3. Maintain suitable snag habitat within and adjacent to treated areas and riparian and spring habitats for primary and secondary cavity-nesting nongame birds.		NG-3a. On commercial woodcutting areas require 2-3 large pinyon pine snags or 2-3 pinyons with snag potential per acre be left.		BLM biologists will add snag stipulations to commercial wood permits and then field check for compliance.	
		NG-3b. Incorporate large pinyon pine snags in islands or untreated areas of treat-		BLM biologists will ensure large snags and groups of older-aged trees with snag	

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		ment projects or leave older-aged islands of live pinyons.		potential are flagged and left untreated.	
NG-4. Protect bat roosts and hibernacula from human disturbance and maintain microclimatic conditions of roost structures.		NG-4a. Maternity roosts and hibernating bats will not be disturbed.		BLM and AGFD biologists will review and evaluate requests which would involve the use of caves for recreation or scientific visits.	
		NG-4b. Care must be taken not to restrict airflow and bat access to roost sites if hazard abatement work is deemed necessary.		Review and evaluate all hazard abatement proposals.	

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RSHM-1. Ensure spring and riparian environments are maintained in a productive habitat condition and where feasible expand and upgrade the habitat quality of this community.		RSHM-1a. Monitor all springs for changes in habitat condition, water availability, and wildlife accessibility. See planned action for spring locations.	Annually	AGFD and BLM biologists will visit specified spring sources annually. Visits will be documented through memo and included in yearly HMP evaluation report.	Annually
		RSHM-1b. Monitor the habitat condition of the Paria Canyon and Kanab Creek riparian zones on an annual basis. When livestock leave the pasture an inspection of range conditions will be made. A memorandum to the file will be prepared for each area as a method of documentation. The lower (grazed) sections of Paria Canyon and the Clearwater Spring area of Kanab Creek will be the inspection areas.	Annually	AGFD and BLM biologists and BLM range conservationists will make annual inspections of range conditions of specified areas and to assist in trend and utilization studies. Memorandums will be prepared and then summarized in the yearly HMP evaluations.	Annually

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		RSHM-1c. Rehabilitate the wet meadow environments by fencing Wilson Spring, Soap Creek Spring, and Fisher Spring.		BLM biologists will program projects through AMP process and assist Operations division in design and feasibility. Operations contract or use Force Account crew for construction.	
		RSHM-1d. Build study exclosures in Paria Canyon to determine natural rate of cottonwood and willow reproduction and to assist in monitoring local range conditions.		Study exclosures will be strategically located by BLM biologists and will assist Operations division in design and feasibility. Operations will contract or use Force Account crew to construct exclosures. Kanab Creek should also be examined for possible exclosures at a later date.	
		RSHM-1e. Develop an operational plan for riparian and spring habitats to implement a cottonwood-willow planting program. Trees will be planted so as not to change the visual character of Paria Canyon.		Two-three planting plots will be selected along the lower sections of Paria Canyon. BLM biologists and the division of Operations will design and conduct feasibility of planting effort. A less intensive	

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		Tentative areas for a planting program are lower sections of Paria Canyon, Clearwater Spring, Kanab Creek, Soap Creek Spring, Lowery Spring, and Fisher Spring.		effort will be attempted at Clearwater, Soap Creek, Badger Creek, Fisher, and Lowery Springs. Growth rates and mortality of planted stock will be monitored. From the results of the pilot program an operational plan will be developed.	
		RSHM-1f. Discourage the development or redevelopment of spring sources that would decrease wet meadow habitat and significantly alter wildlife water distribution. Areas of special concern are listed in planned actions section.		BLM and AGFD biologists should encourage the retention of adequate spring flows to provide sufficient wildlife water and wet meadow habitat at the source. All proposals should be reviewed by each agency and appropriate recommendations made. Proposals should be outlined in the annual HMP evaluation.	

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		RSHM-1g. Encourage the continued reading of hiker impact plots by wilderness and recreation specialists.		BLM biologists will annually review results of hiker impact studies and visitor use of Paria Canyon.	
		RSHM-1h. Support the establishment of a hiker carrying capacity for the canyon once sufficient data has been collected.		Provide wildlife input during the development of a hiker carrying capacity in Paria Canyon. AGFD would be consulted for wildlife information.	
		RSHM-1i. See BP-1c.		See BP-1c.	
RSHM-2. Ensure adequate information is collected on all springs in the HMP area to provide sound habitat management recommendations.		RSHM-2. Document all springs listed in planned actions section. Thoroughly inventory each spring using the District spring inventory card. Take water samples and photographs at each spring site.		BLM and AGFD biologists will document the 16 identified springs to determine habitat condition, water availability, and wildlife accessibility.	

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PROGRESS REPORT

V. PROGRESS REPORT

A habitat management plan progress report will be completed annually. The report will include accomplishments, expenses, and a general summary of HMP progress. The report should also evaluate how well HMP objectives have been accomplished. The annual report will be filed in this section of the HMP each year to serve as a chronological documentation of progress.

COORDINATION

VI. COORDINATION WITH OTHER BLM PROGRAMS, AGENCIES, AND ORGANIZATIONS

A. Other BLM Programs

1. Energy/Minerals Management

Within the last 5 years uranium exploration and production have increased significantly in the HMP area, especially the Kanab Creek drainage. The intensity and distribution of mining are key factors in determining the resultant impact on wildlife communities and thus HMP objectives.

Some of the potential impacts of mineral development are increased vehicular access, increased human disturbance, contamination and use of water sources, localized degrading of habitat, and increased wildlife harrassment and poaching.

To provide proper stipulations and mitigating measures and thus meet HMP objectives for mineral development, the following planned actions address these issues: BP-1f, BP-1g, BP-1i, BP-1j, BP-2b, BP-1a, and BS-1m.

A 0.5 to 1 mile buffer around active bird of prey nests is needed to prevent nest abandonment in most situations. Special precautions should also be taken for nests that are greater than 1 mile from the operation. For example, aerial or vehicular access routes should be designed to avoid constant disturbance within the nest area.

Another alternative is to defer mineral exploration operations during the nesting period of T&E birds, which runs from March 1 to August 31. If operations can be deferred during the nesting season, then an aerial survey is not required to clear the area for threatened and endangered birds of prey.

Because most uranium bearing ores lie next to important cliff nesting areas, all mineral development activities must be surveyed before entry to ensure compliance with Section 7 of the ESA 1978 and Bald Eagle Protection Act as revised 5/31/74.

To date the mineral development program in the HMP area has not significantly altered the hunting habitat for birds of prey. Significant habitat alteration, however, within 5 miles of an established peregrine falcon nest should be discouraged as recommended in the Peregrine Falcon Recovery Plan.

The radioactive contamination of mine waste water, which is usually pumped into settling ponds, and the stock piling of radioactive ore should continue to be monitored to ensure against pollution of the food chain.

The reestablishment of desert bighorn sheep in Hacks, Grama, and Kanab Creek Canyons as proposed in planned actions BS-1a will potentially conflict with energy and mineral exploration through the implementation of planned action BS-1m. This action states, "encourage energy and mineral companies to avoid exploratory activities in critical sheep habitat areas during critical times, e.g. lambing grounds during lambing season and watering sites during late spring and early summer." The intent of this planned action is only to defer exploration during those periods where the activity will have the greatest impact on sheep. Actual mining will not be impacted, as the planned action only covers exploratory activity. If an actual mining operation commences in sheep habitat of any type, the conflict will be unresolved.

BLM will attempt to define those areas most sensitive to energy and mineral exploration and notify the affected parties so that they can better plan around the sensitive areas and seasons. Each plan of operation will be reviewed for possible impacts on bighorn sheep or sheep habitat, and recommendations will be generated to mitigate the impacts. The process will be part of the normal review process that now occurs on receipt of plans of operations for exploratory drilling.

The building of wildlife projects should not conflict with energy and mineral development. To ensure compliance with 3802 and 3809 surface mining regulations and special mitigating measures identified during the EA process, the surface protection specialist must closely monitor all surface disturbance actions.

2. Wilderness

The Paria-Kanab Creek HMP area encompasses all or part of nine WSAs, the Vermillion Cliffs Natural Area, and the Paria Canyon Primitive Area. All planned actions addressed in the HMP must conform to the Interim Management Policy (IMP) and Guidelines of December 1979 until Congress makes a final decision. A number of stipulations outlined in the IMP will benefit HMP objectives.

Mineral development is expected to increase in the area, increasing vehicular access and human encroachment and potentially degrading wildlife habitat, especially desert bighorn sheep and bird of prey habitat. Wilderness designation would limit the establishment of new claims.

Both state and federally listed threatened and endangered species would potentially benefit from wilderness designation.

Desert vegetation cannot be sold or removed for landscaping or other uses in wilderness areas. The increasing consumptive use of desert plants would adversely affect the desert ecosystem in three ways: (1) by increasing vehicular access, (2) by disturbing the land surface during plant removal (short-term impact), and (3) by reducing the long-term production potential of the desert community. Plant removal would degrade habitat conditions for most nongame species.

With the exception of mule deer and to a certain extent pronghorn antelope and other species that depend on subclimax vegetation communities, wilderness designation would benefit most wildlife species occupying the HMP area. Desert bighorn sheep and various species of raptors will especially benefit from wilderness designation.

The restrictions placed on land treatment, predator control, and the introduction of non-native wildlife species are the major negative aspects of wilderness designation. These restrictions, however, are not expected to significantly hinder the implementation of this HMP.

Close coordination with the wilderness program during implementation of the Paria-Kanab Creek HMP is essential to ensure wildlife projects do not impair wilderness suitability. An EA will be prepared for all projects to be constructed in a WSA, ISA, or future designated wilderness areas.

3. Woodland Products Management

Within the HMP area woodland management involves the sale of firewood and posts. The scattered island-like nature of the pinyon-juniper woodland in the HMP area necessitates careful management to meet HMP objectives and planned actions.

Commercial post and firewood permittees are now sent to designated cutting areas, whereas non-commercial applicants are encouraged but not required to go to designated areas.

During the development of woodland products management projects, the following planned actions should be considered and incorporated as appropriate:

a. Encourage the retention of predominately pinyon pine habitat (Paria Plateau and Buckskin Mountains). Planned action NG-2b.

b. On commercial woodcutting areas, require that 2-3 large pinyon pine snags or 2-3 pinyons with snag potential per acre be left. Planned action NG-3a.

c. Maintain adequate Cooper's hawk nesting habitat in pinyon-juniper woodland in the Paria Plateau and Buckskin Mountains and other areas with suitable habitat. Planned action BP-2a.

d. Provide a 0.5 to 1 mile buffer around active raptor nests to prevent nest abandonment. Planned action BP-1f.

e. Discourage land use practices (commercial woodcutting areas) that adversely alter or eliminate the character of hunting habitat of threatened and endangered birds of prey within 5 miles of an active nest. Planned action BP-1j.

f. Discourage commercial post cutting and firewood collection of live pinyon-juniper trees where pinyon-juniper stands make up less than 67 percent of the total service area. Planned action MD-1h.

g. Closely monitor noncommercial post cutting and firewood collection where pinyon-juniper stands make up less than 67 percent of the total service area.

4. Recreation Management

As wildlife habitat conditions and populations improve through the implementation of the Paria-Kanab Creek HMP, so will recreation opportunities. Close coordination with the recreation program is essential, especially with objectives outlined in the Paria Canyon Recreation Management Plan.

In most instances the objectives of the recreation management program will compliment HMP objectives. The following planned actions relate specifically to recreation management:

a. Assess visitor use impact in the Paria Canyon Primitive Area on birds of prey nesting activities. Planned action BP-1h.

b. Monitor ORV use and discourage increased vehicular access to crucial riparian and cliff nesting habitats. Planned action BP-1i.

c. Encourage continued reading of hiker impact plots by wilderness and recreation specialists. Planned action RSHM-1g.

d. Support the establishment of a hiker carrying capacity in Paria Canyon. Planned action RSHM-1h.

e. Rehabilitate and monitor broadleaf riparian habitat in Paria Canyon and Kanab Creek. Planned actions RSHM-1d, RSHM-1e, NG-1h, BP-1e.

f. Improve wildlife habitat conditions through intensive livestock grazing management and monitoring. Planned actions NF-1g, NG-1i, NG-1j, NG-1k, NG-1l, NG-1m, NG-1n, NG-1o, NG-1p, BP-1d, and BP-1h.

g. Monitor fur harvests and population condition of carnivores throughout the HMP area. Planned actions CRV-1a and CRV-1b.

h. Prohibit camping within 0.25 miles of sheep waters. Planned action BS-1n.

i. Close lambing grounds to public access during the lambing period. Planned action BS-1o.

5. Areas of Critical Environmental Concern (ACECs)

No identified ACECs lie within the HMP area. If an ACEC is identified, the recommendation for protection or management will include wildlife considerations that support the wildlife objectives of this HMP.

6. Soil, Water, and Air Resources

Most projects initiated under watershed guidance will complement the wildlife objectives of this HMP. Likewise, most of the planned actions of this HMP will enhance the long-term watershed qualities of the area. To ensure adequate consideration for enhancing watershed values, a soil scientist and

hydrologist will be consulted in the design of wildlife projects when needed.

Soil, water, and air resources impacted by other land uses must be maintained in an acceptable condition to complement this HMP's objectives.

7. Fire Management

The support of and coordination with the fire management program is needed to achieve stated HMP objectives and planned actions.

Important habitat areas that must be protected from fires must be incorporated in the district's modified suppression plan. Key high risk areas in which wildfire would be detrimental to habitat objectives include the following:

- Ponderosa pine habitat on Paria Plateau. Planned action NG-1b.
- All riparian and spring habitats, especially with overstory trees (cottonwood, willow, and box elder). Planned actions RSHM-1a, RSHM-1b, and NG-1a.
- Cover conditions (1/8 mile) around livestock and wildlife water developments and study exclosures. Planned action MD-1g.

Although presuppression firebreaks have not been identified for the HMP area, firebreaks and firelines should be built so as not to increase vehicular access into inaccessible areas.

A fire management plan has been completed for the Arizona Strip District, which should provide adequate fire management for the HMP area.

During feasibility, design, and maintenance of inaccessible wildlife projects the fire helicopter has provided essential support.

Fire crews will often assist in the maintenance of existing wildlife projects during periods of low fire danger.

Prescribed burning will be used to accomplish several objectives, including the conversion of vegetation to a more desirable seral stage. The need for prescribed burning is identified in planned actions MD-1j-1.

A fire plan for individual prescribed burns before burning will identify the objectives of the burn. Fire prescription will also be included. The district fire management officer will be responsible for writing the prescription and the plan. The area wildlife biologist will develop the objectives and assist in writing the plan. The use of the helitorch will be helpful in completing the burns. The fire management officer will supervise all prescribed burns.

8. Livestock Management

The maintenance and improvement of forage conditions throughout the HMP area largely depends on the effectiveness of grazing systems and the ability to accurately monitor them. Therefore, accomplishing habitat objectives that deal with livestock grazing management are contingent upon meeting desired AMP objectives.

Interaction between livestock grazing management and the HMP implementation will be high. Both activities often complement each other but sometimes conflict. The following

planned actions along with a brief statement summarizes the effect of the planned action on livestock grazing operations or management.

Several planned actions deal with the livestock management program:

a. Provide some wildlife funding for Beanhole livestock catchment and provide separate trough and storage for antelope. This catchment is needed to implement the Beanhole AMP. Planned action PA-1d.

b. Reintroduce bighorn sheep to Paria and Hacks Canyons. Some potential exists for conflict between bighorn and livestock. Planned actions BS-1a and BS-1b.

c. Transplant more antelope to Buffalo Ranch or House Rock Valley. Antelope should conflict little with livestock. Planned action PA-1a.

d. Build two 5,000-gallon storage tanks on two existing livestock pipelines to provide a more reliable water source for both antelope and livestock. Planned action PA-1d.

e. Extend existing pipeline 1.5 miles to the south to provide more water for antelope and livestock. Planned action PA-1d.

f. Upgrade Wooley livestock catchment to provide more reliable water for livestock and antelope. Planned action PA-1d.

g. Modify five livestock waterlots for mule deer access. The modification of fences may not be as effective in holding livestock. Planned action MD-3.

h. Modify 40 miles of range fences in antelope habitat. Many of the fences are in poor condition. The modification will also involve light fence maintenance. Planned action PA-1e.

i. Modify boundary fence between public lands and Buffalo Ranch. Planned action PA-1f.

j. Discourage the development of new livestock waters within 2 miles of bighorn sheep habitat. Planned action BS-1g.

k. Determine if livestock-bighorn sheep conflicts occur and resolve the conflicts under multiple-use guidance. This change could have a moderate impact on some allotments, particularly custodial and less intensive allotments. Planned action BS-1h.

l. Discourage the extension of livestock use on the Vermillion Bench from what now occurs. This should have little impact in that most of the areas are difficult for livestock to use. Planned action BS-1i.

m. Encourage moderate utilization levels on cool-season grasses in bighorn sheep habitat. This planned action puts more emphasis on cool-season grasses and may have a moderate impact on a few livestock operations. Planned action BS-1k.

n. If feasible, all strategically placed water facilities should be left on yearlong for antelope use. Planned action PA-1c.

o. Encourage the implementation of grazing systems. Planned action PA-1g.

p. Contribute wildlife funds towards the implementation of the 1,200-acre Coyote AMP land treatment. This land treatment will help implement the Coyote AMP and will highly benefit livestock grazing management. Planned action MD-1j.

q. Create five 20- to 50-acre deer forage patches to improve forage conditions for wildlife and livestock. Planned action MD-1k.

r. Use prescribed burns to reduce pinyon-juniper overstory and enhance Gambel oak growth and vigor. Planned action MD-1l.

s. Ensure that all mechanical, chemical, and fire vegetation treatments provide for the habitat needs of all wildlife species and that impacts are properly mitigated. Planned actions NG-2a, NG-2b, NG-3b, BP-2a, BP-1j, and BP-2b.

t. Encourage intensive grazing management throughout the HMP area. Planned actions NG-1i, NG-1k, NG-1n, NG-1o, and BP-1e.

u. Focus in on the monitoring of key wildlife habitat areas (cliff habitats, riparian and spring habitats, canyon and wash habitats). Planned actions NF-1g, NG-1j, NG-1l, NG-1m, AR-1c, BP-1d, RSHM-2, RSHM-1d, RSHM-1f, BP-1a, NG-1c, NG-1a, NG-1b, RSHM-1a, and RSHM-1b.

v. Rehabilitation of spring and riparian environments. Planned actions RSHM-1c and RSHM-1e.

Livestock grazing is monitored by BLM personnel. Utilization and trend studies will be the main vehicle for analyzing

impacts on wildlife. Where conflicts between livestock and HMP objectives occur, existing data, and if necessary, additional data will be collected to provide the decisionmaker with the information to make the necessary decisions within multiple-use guidelines. The planned actions within the HMP are not a hard and fixed policy. Exceptions to the planned actions may be made on a case-by-case basis by reviewing the individual merits of each proposal. Overall, the implementation of the HMP objectives and planned actions will be a coordinated effort by BLM, AGFD, and livestock operators. Livestock operators will be notified before any action on their allotments and will be given the opportunity to provide input.

Area biologists will coordinate HMP project construction with range conservationists. Where biologically and economically feasible projects may be combined.

Close coordination must also occur during the evaluation and development of AMPs to ensure HMP objectives are considered.

Proposed introductions of native wildlife are to be coordinated with the livestock grazing program where possible conflicts with this program are identified.

9. Support Actions

The success of the HMP depends upon the completion of a wide variety of projects. The Division of Operations will ensure the completion of the majority of the projects. Operations will be responsible for project survey and design, supervise contracts, order materials, and complete force account projects on allotments where conflicts between livestock and big game occur. Existing data, and if necessary, additional data will be collected to provide the justification to write the objectives to meet the necessary adjustments within multiple-use allotments. The planned actions in the AMP as a whole have and wildlife. Recommendations on the planned actions will be made on a case-by-case basis by reviewing the individual actions within previously defined. The implementation of the AMP objectives and planned actions will be a cooperative effort by BLM, F&G, and livestock operators. Livestock operators will be notified before any action on their allotments and will be given the opportunity to provide input.

Area biologists will coordinate the project construction with range conservationists, where biologically and economically feasible projects may be combined.

Close coordination must also occur during the evaluation and development of AMPs to ensure HMP objectives are considered.

Proposed implementations of native wildlife are to be coordinated with the livestock grazing program where possible conflicts with this program are identified.

5. Support Actions

The success of the HMP depends upon the completion of a wide variety of projects. Supervision of operations will assure the completion of the majority of the projects. Operations will be responsible for project survey and design, acquiring contracts, other materials, and complete force account projects. Equipment, tools, and manpower will also be needed. Helicopter time will be required for initial construction and maintenance of remote projects.

Support will also be required of the realty specialist for land acquisition. The district landscape architect will be involved in designing and locating structures and land treatment areas to assure compliance with VRM guidelines.

The cost and implementation schedule will identify the workmonths, time frame, money, and responsibility of all BLM programs needed for the success of the HMP.

Specific planned actions identify the location of projects, water sources of importance, maps of land acquisition, and other support actions.

B. Other Agencies and Organizations

1. State Agencies

The Arizona Game and Fish Department is the state species managing agency for the HMP area. AGFD involvement has been intense. BLM conducted the field surveys to gather data for preparing the habitat analysis in cooperation with the AGFD (Region II). In addition, AGFD cooperated with BLM in preparing and reviewing the habitat analysis and in formulating the HMP objectives and planned actions.

2. Federal Agencies

The Glen Canyon National Recreation Area, Grand Canyon National Park, Kaibab National Forest (North Rim), and BLM Cedar City District office have reviewed the draft HMP. Coordination with the above agencies will continue to be an integral

part of the implementation of this plan. The Fish and Wildlife Service (Phoenix Field Office) and above named agencies will be sent a final copy of the HMP. The Fish and Wildlife Service will be closely coordinated with on all actions that may potentially affect T&E species or habitat.

3. Universities

Dr. Paul Krausman of the University of Arizona made suggestions during development of the bighorn sheep habitat analysis methodology. The objectives and planned actions of the HMP were extracted from the information found in the habitat analysis.

4. Nongovernmental Organizations

Nongovernmental organizations include wildlife groups, councils, societies, and the public. BLM enlisted the involvement of these organizations during the preparation of the URA/MFP planning document from which this activity plan has evolved. BLM considered the concerns and recommendations of these organizations and the public in issuing its final management decisions. Many of these decisions favor the enhancement of wildlife species on the Paria-Kanab Creek HMP area (see the Vermillion URA/MFP).

Individuals and groups providing specific wildlife comments during the Vermillion URA/MFP process are listed below:

Arizona Cattle Growers Association
Stanley Schmutz - Livestock Permittee
Gerald Daley - Landscape Architect
Fred Heaton - Livestock Permittee
Town of Fredonia, Arizona - Concerned Citizens
Littlefield NRCD - Concerned Citizens
Brian Massumi - Arizona Conservation Council
Phoenix Meeting - Concerned Citizens

Arizona Game and Fish Department
Phillip Foremaster - Livestock Permittee
Norman Jackson - Livestock Permittee
Kevin Dahl - Concerned Citizen
Ben Avery - Outdoor Writer
Jeffery Ingram - Concerned Citizen
Verlis Fischer - Concerned Citizen
John Vaughn - Livestock Permittee

The Kaibab Paiute Indian Tribal Council will be coordinated with regarding the implementation of this HMP in regards to specific actions.

5. Ongoing Coordination Process

Coordination of specific planned actions will be a continuing process. Planned actions which are identified not to cause significant environmental degradation or unduly conflict with existing land use will not require an environmental assessment.

Consequently, throughout HMP implementation, coordination with interested publics will occur by actions identified in the Public Affairs Plan and the Environmental Assessment process.

Environmental assessments will be made a permanent part of this HMP. All comments are kept on file in the Vermillion Resource Area Office.

a. An environmental assessment of the desert bighorn sheep transplant and corresponding provision in Paria-Kanab Creek HMP (EAR Registry No. AZ-010-83-362)

A detailed environmental assessment (EA) was completed for the Paria and Kanab Creek bighorn sheep transplants. A copy of the EA is contained in the Environmental section on page 110. Thirty-five copies of the EA were sent out to various state and federal agencies, user groups, and conservation groups.

The following is a list of interested parties from which comments were solicited:

John O. Vaughn, permittee
Heaton Livestock Company, permittee
7-11 Cattle Company, permittee
Earl Sorensen, Jr., permittee
C. A. Griffiths & Sons, permittee
Fred Heaton, et al, permittee
Clark Lamb, permittee
Rolland Lamb, permittee
Elson B. Riggs, permittee
John V. Schoppman Family, permittee
Stanley Rodgers, permittee
David Johnson, permittee
E. J. Graff, permittee
Kanab LDS Stake, permittee
Ramsey Cattle Company, permittee
John Lancaster, GCNRA Superintendent
Carl Taylor, North Kaibab District Ranger
Richard Marks, GCNP Superintendent
Rex Rowley, Kanab Resource Area Manager
Morgan Jensen, Cedar City District Manager
Arizona Desert Bighorn Sheep Society, President
Dan Dagget, Sierra Club
Charles Dewitz, Cliff Dwellers Lodge
Mike Johns, Arizona Wildlife Federation Director
E. J. Johnson, Arizona Mining Association
Levi Packard, AGFD Region II
John Vaughn, Energy Fuels Nuclear, Inc.
Preston W. Swapp Estate, permittee
J. R. Jones, permittee
Michael D. Scott, The Wilderness Society
Chairman, Coconino County Board of Supervisors
David Bishop, Mohave County Board of Supervisors
Vashti Supplee, The Wildlife Society
Steve Johnson, Defenders of Wildlife
Rick Mollineaux, Coconino Sportsmen

b. Environmental Assessment - Hacks #1 Wildlife Catchment (EAR Registry #AZ-010-83-361)

The Arizona Game and Fish Department will build a metal apron wildlife catchment and pipeline using BLM furnished material on the ridge top off a point that overlooks Hacks Canyon from the south rim. The project is located in the Hacks Canyon (033A) WSA at the center of T36N R4W Section 5. A copy of the EA is contained in the Environmental Assessment section on page 110.

WILDLIFE ECONOMICS

VII. WILDLIFE ECONOMICS

The purpose of this section is to estimate and compare the benefits and costs associated with this HMP. Benefit/Cost (B/C) analysis is the principal analytical technique used to evaluate expenditure and allocation decisions in the public sector. The rationale for B/C analysis consists of the following steps:

A. The project or projects to be analyzed are identified.

B. All the impacts, both favorable and unfavorable, present and future, on all of society are determined.

C. Dollar values, when possible, are used to estimate impacts. Favorable impacts are counted as benefits, while unfavorable ones as costs.

D. The net benefits divided by net costs give the B/C rates.

All benefits and costs in the following analysis are converted to present value dollars using a discounting procedure with a 7.785 percent discount rate.

Benefit Estimates

Benefits resulting from the HMP will include increased hunting opportunities for deer, antelope, and bighorn sheep. The dollar values for deer and antelope hunting were based on Forest Service RPA estimates. The dollar value for bighorn sheep was estimated by the Arizona Game and Fish Department personnel. All the dollar value estimates are willingness to pay values. The Arizona Game and Fish Department personnel also estimated the number of hunter days for this HMP.

Hunter Day Increase Projected with the HMP per year	
Deer	2,087
Antelope	2,800
Bighorn Sheep	48

Estimate of Benefits over 50-year period	Unit Values	Discounted
Deer	$23.46	$484,069
Antelope	23.46	649,446
Bighorn Sheep	400.00	159,016

The total present value of benefits using a 7.875 percent discount rate is $1,429,159.

Costs

The costs associated with the HMP will be construction costs, replacement costs, monitoring costs, and operation and maintenance costs.

Once the HMP is fully implemented, there is expected to be $5,100 of annual operation and maintenance costs. To compare costs with benefits occurring in different time periods, they must be discounted to present value. The discounted costs are as follows using the 7.875 percent discount rate.

Year	Undiscounted Costs
1	$ 83,975
2	118,075
3	118,175
4	111,075
5	81,150

Total discounted costs totaled $478,840.

The B/C ratio = 1,429,159 = 3.0/1
478,840

The benefits cost ratio (benefits divided by costs) is 3.0/1. This B/C ratio leads to the conclusion that benefits will exceed costs.

Hunter Day Increase Projected with the HMP per year	
Deer	2,087
Antelope	2,800
Bighorn Sheep	48

Estimate of Benefits over 50-year period	Unit Values	Discounted
Deer	$23.46	$484,069
Antelope	23.46	649,446
Bighorn Sheep	400.00	159,016

The total present value of benefits using a 7.875 percent discount rate is $1,429,159.

Costs

The costs associated with the HMP will be construction costs, replacement costs, monitoring costs, and operation and maintenance costs.

Once the HMP is fully implemented, there is expected to be $5,100 of annual operation and maintenance costs. To compare costs with benefits occurring in different time periods, they must be discounted to present value. The discounted costs are as follows using the 7.875 percent discount rate.

Year	Undiscounted Costs
1	$ 83,975
2	118,075
3	118,175
4	111,075
5	81,150

Total discounted costs totaled $478,840.

The B/C ratio = $\frac{1,429,159}{478,840}$ = 3.0/1

The benefits cost ratio (benefits divided by costs) is 3.0/1. This B/C ratio leads to the conclusion that benefits will exceed costs.

IMPLEMENTATION
SCHEDULE

COST ESTIMATES

PUBLIC AFFAIRS

VIII. PUBLIC AFFAIRS PLAN

A. Objective

This plan will be developed to inform state and Federal agencies and interested public groups and individuals of the HMP objectives and planned actions. The intent of the HMP is to maintain and improve wildlife habitat for various wildlife species in the Paria-Kanab Creek area involving 740,000 acres of the Vermillion Resource Area in the eastern part of the Arizona Strip. HMP objectives are based upon habitat analysis and guidance and decision of the Vermillion Management Framework Plan (VMFP).

A1/2 → Background of Past Public participation

B. Key Points and Concepts

1. Potential exists to increase the numbers and species of animals inhabiting the area, especially desert bighorn sheep, mule deer, and pronghorn antelope.
2. Point out that the decline in quality and quantity of wildlife habitat and associated species requires action to be taken over a period of years.
3. Emphasize that past records show that mule deer and bighorn formerly inhabited this area in greater abundance than at present. The HMP objective is to achieve historical habitat and abundance levels.
4. Most projects will improve the existing situation under the multiple use concepts, and de-emphasize livestock/wildlife conflicts.
5. The public lands are administered by BLM, but species management is the responsibility of AGFD. Funding will be obtained through the Sikes Act authority.

6. Peregrine falcon use the HMP area to a greater extent than other areas on the Arizona Strip. This plan will enhance the habitat for this T&E species.
7. This HMP will also support objectives of the Paria Canyon Recreation Management Plan and Kanab Creek's RARE II (USFS proposal) for management of wildlife habitat in wilderness areas.
8. Provisions are made for intensive, organized monitoring of wildlife habitat (BLM) and species transplants and surveys (AGFD).

C. Public Attitudes

Much support for the plan is anticipated from sportsmen and conservation groups. Enhanced habitat will increase game and non-game species. Bighorn sheep transplants will increase recreation opportunities. Enjoyment of outdoor recreation such as camping, hiking, and bird watching could be improved through implementation of this plan. Improved habitat conditions for upland game birds and waterfowl should increase recreation activities for sportsmen. Educational opportunities for grade schools and universities alike could benefit through improved wildlife habitat conditions in the HMP area.

Livestock permittees and groups involved with energy-related exploration and development, however, will oppose the plan because of conflicting land use proposals. In addition, the public often opposes the protection of threatened, endangered, or sensitive species at the expense of other activities. Controversy is limited, however, to the local populace.

D. Public Affairs Tools

1. News releases

2. Personal contacts and letters

3. Slide show

4. Signs erected at all project sites

5. Signs to identify the HMP boundaries.

E. Time/Action Sequence

Date and Responsible Party	Action
May 30, 1983 (Middlebrook/Slone)	Wildlife biologists will present rough draft objectives and planned actions to Arizona Game and Fish Department representatives.
July 15, 1983 (Middlebrook/Slone)	Complete rough draft and circulate for agency review.
August 10, 1983 (Slone/Avey)	Issue news release and summarize what went into HMP preparation: history, habitat analysis, inventories, planning system, proposed projects for FY 1984 and following years.
August 26, 1983 (Slone)	Receive comments from public review.
October 1983 (Slone/Avey)	Issue news release upon final approval of plan.
As needed (Slone/Avey)	Succeeding news releases will be issued to the media as major projects are accomplished: -controlled burns -revegetation of riparian habitat -catchment and spring development -range and waterlot fence modifications -species transplants Slide show will be developed to present our intention to civic groups and organizations and another follow-up slide show explaining results of our efforts.
As Needed (Slone/Kalish)	Signs will be developed and placed at all project sites: catchments, controlled burns, and fenced riparian areas. HMP boundary signs will be placed in strategic areas to be further identified at a later date.

The timing and accomplishments will be based on manpower and funding. The above guidelines, however, will be used to take action as the HMP progresses.

IMPLEMENTATION SCHEDULE

COST ESTIMATES

IX. IMPLEMENTATION SCHEDULE

The following implementation schedule has been developed through fiscal year 1988. The project activities have been identified as well as who will be responsible to insure their completion. The units of completion are identified by reporting period as well as by the planned action they support.

The implementation schedule depends upon the availability of money and manpower for the particular years, but implementation will be sequential.

IMPLEMENTATION SCHEDULE
(and units of accomplishment)

PROJECT ACTIVITY	RESPONSIBILITY (4)	FY 84	FY 85	FY 86	FY 87	FY 88
(1) CATCHMENTS						
Hacks #1	AGFD	1				
Hacks #2	BLM	1				
Fisher Point	BLM		1			
Badger Canyon/Sliprock	BLM		1			
Gunsight Chukar	BLM/AGFD		1			
Paria Canyon Rim	BLM			1		
Franks	AGFD			1		
Pine Hollow	AGFD			1		
Powells Monument	BLM			1		
The Hole slickrock	BLM				1	
East Buckskin	AGFD				1	
Rock Canyon	AGFD				1	
Grama	BLM					1
Paria Point	BLM					1
Narrows Slickrock	BLM					1
(2) SPRING DEVELOPMENTS						
Wilson Spring	BLM		1			
Wilson Canyon Seep	BLM		1			
Fisher Spring and Pipeline (1)	BLM			1		
Jacobs Pools Dikes	BLM			1		
Paria Point Seep #1	BLM				1	
Paria Point Seep #2	BLM				1	
Moehnauve Seep	BLM					1
(3) LIVESTOCK/WILDLIFE WATER FACILITIES						
Beanhole Livestock Catchment (1)	BLM	1				
Kane Springs Storage Tanks & Pipeline	BLM	1				
Coyote (Pine Hollow) Livestock Catchment (1)	BLM		1			
Soap Tank Storage Tank & Trough (1)	BLM		1			
(4) UPGRADE EXISTING CATCHMENTS						
Kanab Creek				1		
Jims Catchment	BLM				1	
Wooley Catchment	BLM					1
(5) WATERLOT FENCE MODIFICATIONS						
Middle Reservoir	BLM	1				
Bentonite Reservoir	BLM	1				
Coyote Springs	BLM		1			
Bushhead Stock Tank	BLM		1			
Johnson's Spring	BLM			1		
(6) RANGE FENCE MODIFICATIONS (see PA-2a for locations)						
Priority #1 & 2	BLM	11.5 mi				
Priority #3, 4, & 5	BLM		10.5 mi			
Priority #6, 7, & 8	BLM			11.0 mi		
Priority #9, 10, & 11	BLM				7.0 mi	
Buffalo Ranch Boundary	AGFD	5.0 mi				

IMPLEMENTATION SCHEDULE
(and units of accomplishment)

PROJECT ACTIVITY	RESPONSIBILITY (4)	FY 84	FY 85	FY 86	FY 87	FY 88
(7) LAND TREATMENT						
Coyote AMP Land Treatment (1)	BLM		1200 ac			
Deer Forage Patches	BLM/AGFD		250 ac	250 ac	250 ac	250 ac
Oak burns (2)	BLM/AGFD		50 ac	50 ac	50 ac	50 ac
(8) RIPARIAN ENHANCEMENT						
A. Fence the following springs:						
-Wilson	BLM		1			
-Soap Creek (lower source)	BLM		1			
-Fisher	BLM		1			
B. Plant cottonwoods and other native riparian vegetation:						
-Soap Creek (drainage)	BLM		1			
-Badger Creek (drainage)	BLM			1		
-Fisher Spring (source)	BLM				1	
-Lowery Spring (drainage)	BLM					1
-Paria Canyon (lower) (3)	BLM		1	1	1	1
-Kanab Creek (3)	BLM		1	1	1	1
-Operational plan for Paria/Kanab Creek	BLM	1				
(9) HABITAT MONITORING						
A. Exclosures:						
-Paria Canyon	BLM		1			
-Hacks Canyon	BLM			1		
-Paria Canyon Rim	BLM				1	
B. Document the 16 springs and seeps as listed in RSHM-2:	BLM		16			
C. Monitor the following springs annually:		1	1	1	1	1
-Wrather Canyon Spring	BLM					
-Bush Head Canyon Spring	BLM					
-Lost Spring	BLM					
-Wilson Spring	BLM					
-Unnamed Spring	BLM					
D. Monitor water quality and flow data of Paria River:	BLM/AGFD	1	1	1	1	1
E. Monitor habitat condition of Paria Canyon and Kanab Creek:	BLM	1	1	1	1	1
F. Inventory and monitor ponderosa pine habitat on Paria Plateau:	BLM	1		1		1
G. Monitor Savory Grazing Method (SGM) on Signature Rock AMP:	BLM	1	1	1	1	1
H. Monitor peregrine falcon/bald eagle habitat:	BLM	1	1	1	1	1
I. Collect and analyze fecal data for deer, bighorn sheep, antelope, and livestock:	BLM/AGFD	1	1	1	1	1
J. Define key bighorn sheep use areas and monitor:	BLM/AGFD	1	1	1	1	1
K. Establish deer pellet plots and monitor annually:	BLM/AGFD		1	1	1	1

IMPLEMENTATION SCHEDULE
(and units of accomplishment)

PROJECT ACTIVITY	RESPONSIBILITY (4)	FY 84	FY 85	FY 86	FY 87	FY 88
(10) SPECIES MANAGEMENT						
A. Determine species occurrence as called for in the planned actions:	AGFD			1		
B. Reintroduce desert bighorn sheep and make supplemental transplants as necessary to:						
-Paria Canyon-Vermillion Bench	AGFD	1				
-Hacks Canyon-Kanab Creek (when conflicts are resolved)	AGFD					
C. Transplant antelope to Buffalo Ranch or House Rock Valley:	AGFD	1				
D. Conduct yearly surveys to determine population parameters, trend, and movement of deer, antelope, and bighorn sheep:	AGFD	1	1	1	1	1

(1) These projects are cost sharing with range program.

(2) The FY 85 oak burn is experimental. If it is successful then other burns will be planned.

(3) An operation plan will be developed prior to these projects. They will be done on a test basis first and depending upon the success, approximatedly 1 to 3 acres will be planted annually.

(4) All projects identified as AGFD responsibility will depend on available funding and manpower. For water developments BLM will furnish materials and AGFD will provide labor.

COST ESTIMATES

X. COST SCHEDULE

Costs for implementing and maintaining the HMP have been estimated through fiscal year 1988. The costs are not broken down for each unit of accomplishment but are calculated for the total of all units. Costs do not include the money needed to cover workmonths.

Expenses required for AGFD to carry out their transplant programs and on-going studies have not been included in the cost estimates.

The costs for the AGFD's share of the plan implementation have not been identified by specific projects but were estimated to be approximately 10 percent of the total cost of implementing the plan.

COST SCHEDULE
($ in thousands)

	FY 84		FY 85		FY 86		FY 87		FY 88		TOTALS	
PROJECT ACTIVITY	$	W.M.	$	W.M.	$	W.M.	$	W.M.	$	W.M.	$	W.M.
(1) CATCHMENTS												
A. Project Survey and Design		2.0		2.0		2.0		2.0		.5		8.5
B. Construction	17.5		15.5	.5	36.0		35.5		30.0		134.5	.5
C. Maintenance			.4		1.0	.5	1.8	1.0	3.2	1.5	6.4	3.0
(2) SPRING DEVELOPMENTS												
A. Project Survey and Design		1.0		1.0		1.0		.5				3.5
B. Construction			7.0		4.0		6.0		3.0		20.0	
C. Maintenance					.4	.5	.8	.5	1.0	.5	2.2	1.5
(3) LIVESTOCK/WILDLIFE WATER FACILITIES												
A. Project Survey and Design		1.0		.5								1.5
B. Construction	15.0		7.5								22.5	
C. Maintenance					.5		.6		.7		1.8	
(4) UPGRADING EXISTING WATERS												
A. Project Survey and Design		1.0		1.0		1.0						3.0
B. Construction			3.0		4.0		6.0				13.0	
C. Maintenance					.3	.5	.6	.5	.9	.5	1.8	1.5
(5) WATERLOT FENCE MODIFICATIONS												
A. Project Survey and Design		1.0		1.0		.5						2.5
B. Construction			5.0		6.0		3.0				14.0	
C. Maintenance*												
(6) RANGE FENCE MODIFICATIONS												
A. Project Survey and Design		1.0		1.0		1.0						3.0
B. Construction	6.6		4.2		4.4		2.8				18.0	
C. Maintenance* and Inspection		.25		.25		.25		.25				1.0
(7) LAND TREATMENT												
A. Project Survey and Design		2.0		1.0		1.0		1.0				5.0
B. Treatment			18.0	2.0	9.0	1.0	9.0	1.0	9.0	1.0	45.0	5.0
(8) RIPARIAN ENHANCEMENT												
A. Project Survey and Design		3.0		1.0		1.0		1.0				5.0
B. Treatment			10.2	3.0	8.5	3.0	8.5	3.0	8.5	3.0	35.7	12.0
C. Maintenance					.5	.5	1.0	.5	1.5	.5	3.0	1.5
(9) HABITAT MONITORING												
Exclosures												
A. Project Survey and Design		.5		.5		.5						1.5
B. Construction			2.0		2.0		2.0				6.0	
Monitoring and Writing HMP Progress and Evaluation Report		3.0		3.0		3.0		3.0		3.0		15.0
Fecal Analysis	1.0		1.0		1.0		1.0		1.0		5.0	
(10) TRANSPLANTS		.5		.5								1.0

5-YEAR TOTAL EXPENDITURE:	328.9	75.5
TOTAL BLM COSTS:	325.4	75.5
ESTIMATED CONTRIBUTION**:	3.5	
AGFD:		

*Maintenance responsibility of permittee.

**Labor costs for construction of Hacks Wildlife Catchment #1 completed in FY 83. AGFD's contributed labor costs will depend on available funding and manpower.

CONCURRENCE & APPROVAL

ENVIRONMENTAL ASSESSMENT

XI. CONCURRENCE AND APPROVAL

This HMP as written meets with our concurrence and approval.

G. William Lamb

District Manager, Arizona Strip District, BLM

11/18/83

Date

Director, Arizona Game and Fish Department

Date

Regional Supervisor, Flagstaff Regional Office, AGFD

Date

Ferron L. Leavitt

Area Manager, Vermillion Resource Area, BLM

9/29/83

Date

We will approve changes to the approved version of this HMP before any associated action is implemented.

The 5-year revision of this HMP will involve contributions from all the above agencies and will be contingent upon the approval of these agencies.

ENVIRONMENTAL
ASSESSMENT

XII. ENVIRONMENTAL ASSESSMENT

EA #AZ-010-83-362

ENVIRONMENTAL ASSESSMENT

Desert Bighorn Sheep Transplants and Corresponding Provisions in Paria-Kanab Creek HMP

I. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

A. Proposed Action

The Arizona Game and Fish Department in cooperation with the Bureau of Land Management proposes to transplant 20 to 40 desert bighorn sheep (Ovis canadensis nelsoni) within the Paria Canyon-Vermillion Bench area (Arizona public lands only) and Hacks Canyon. This action is an initial stage to manage the habitat for an estimated population of 175 sheep within the Paria Canyon-Vermillion Bench area and 130 sheep within the lower Kanab Creek drainage including public lands west of Kanab Creek, Hacks Canyon east of Hacks Mine, and the lower 3 miles of Grama Canyon (see the enclosed maps).

The proposed transplants may occur as early as July 22, 1983 but will more likely take place between August and October. The time urgency is the result of a fear that a winter die-off may occur in the sheep population of the Black Mountains in Arizona due to a temporary overpopulation. The Arizona Game and Fish Department is also using an apple mash baiting technique for trapping sheep that is most effective during summer months and less costly than other trapping techniques. The proposed transplants are within the Arizona Game and Fish Department's strategic plan of reestablishing desert bighorn sheep in historic range within Arizona.

The first priority is to release approximately 20 sheep in Bushhead Canyon (T. 41 N. R. 6 E. sec. 23 N1/2), a tributary of Paria Canyon. The second priority is to release the same number in Hacks Canyon, 1 mile southwest of Willow Spring at T. 36 N. R. 4 W. sec. 5, NWNE. If additional sheep become available, a second group of 20 sheep will be released at one of the following sites: Bushhead Canyon, Wilson Canyon, Fisher Spring, Badger Spring or Soap Creek Spring. The latter three locations are along the Vermillion Bench at the base of the Vermillion Cliffs. And again, if sheep are available, a second release will be made in Hacks Canyon, probably at the same site as the first.

The release in Bushhead Canyon will be made by helicopter from Lee's Ferry where the captured sheep will arrive by truck. The Hacks Canyon release will be by truck or trailer. Whichever, cross country vehicular travel will be necessary for approximately 3/4 mile from the Hacks Canyon road to the release site (see enclosed map of the route). The cross-country access will begin 100 yards west of the gate into Hacks Allotment and will follow along the west side of the allotment fence for approximately 1/4 mile. A portion of the fence will be laid down to allow vehicular traffic over the fence. The access route then twists and turns to avoid rock

outcrops and deep gullies and after about 200 yards crosses a wash that will require the removal of some small boulders and fill work accomplished with hand tools. The route then continues in fairly level, rock-free terrain for approximately 1/2 mile.

A temporary enclosure (15 x 25 feet) will be constructed at each release site. The enclosure consists of hogwire, 48 inches high, with hogwire also covering the top of the enclosure to make a totally enclosed holding pen. Burlap will then be placed over the entire enclosure to prevent an outside view. Approximately 14 steel posts will be spaced 6 to 8 feet apart. The enclosures will be constructed prior to the release dates and will be removed after the releases are completed. The Hacks Canyon release enclosure material will be trucked in and the Bushhead Canyon material will be flown in by helicopter.

Background Information

As part of the Paria-Kanab Creek Habitat Management Plan (HMP) development, potential bighorn sheep habitat was analyzed. The HMP boundary begins along the west rim of Kanab Creek and follows along the contours of the rims of the tributary canyons west of Kanab Creek. The Utah state line forms the north boundary and the Marble Canyon National Monument and Grand Canyon National Park form the east boundary. Fredonia and the surrounding private land along with the North Kaibab National Forest are not part of the HMP area. The Grand Canyon National Park is the south boundary at Kanab Creek and Forest Service land is the south boundary elsewhere.

Within the HMP area the desert bighorn sheep, mule deer, and antelope were considered the key wildlife species for habitat management goals. A total of 170,000 acres of potential sheep habitat was analyzed to determine the quantity and quality of sheep habitat. Escape cover, water distribution and availability, competition, factors such as forage quantity and quality, and human disturbance were examined. Potential sheep habitat was considered to consist of cliff structures with their associated talus slopes and alluvial fans and 1 mile beyond.

Hansen's (1980) bighorn sheep habitat evaluation procedures were used with some modification to rate the overall habitat quality and to define the better habitat areas. An intensive vegetation inventory was conducted in the spring and fall of 1981, and spring of 1982 by AG&FD and BLM personnel. Overall, sheep habitat was considered good and had a potential of supporting self-sustaining populations of bighorn sheep. The areas listed below are considered to have the better habitat.

1. Paria Canyon, south of Judd Hollow.

2. The Vermillion Bench from Jacobs Pools eastward to the Paria Canyon and to a lesser degree the bench west of Jacobs Pools to Hob Brown Spring.

3. Lower Kanab Creek south of Grama (Loco) Point.

4. Hacks Canyon east of Hacks Mine and lower Grama Canyon.

Upper Kanab Creek around Gunsight and Rock Canyons also rated high but due to the intensity of mineral activity and associated human activity, the area was considered unsuitable for intensive habitat management for bighorn sheep at this time. The same applied to upper reaches of Grama and Hacks Canyons. The breaks along the Narrows of Paria Canyon, the rim of the Vermillion Cliffs, and the Thousand Pockets area were considered to be less valuable as sheep habitat but did contain some potential. The enclosed maps show the approximate boundary of where the habitat will be managed in part for bighorn sheep. Areas such as upper Kanab Creek may some day be re-evaluated, but at this time will not be considered within the bounds of the management goals.

The population goals established were based upon the professional judgment of AG&FD personnel after the habitat was evaluated and after consultation with BLM personnel. The population figures were well below the estimated carrying capacity based upon forage resources alone. There is enough non-competitive forage (in areas inaccessible to livestock) available to support 160 sheep at 10 percent utilization levels. Such levels are well below the forage carrying capacity. The population objectives are believed to be low enough so as to minimize conflicts with other land uses, though some conflicts may occasionally arise.

Provisions

The following recommendations are provisions proposed to facilitate the protection or enhancement of bighorn sheep habitat and are analyzed in the EA for public comment. These recommendations apply to public lands in Arizona only.

1. Discourage the establishment of new livestock waters within 2 miles of the Paria Canyon, the Vermillion Cliffs, the rims of Grama and Hacks Canyons, and Kanab Creek south of Grama Point.

   This provision is to maintain slight-to-light utilization levels and to discourage livestock concentration in bighorn sheep habitat. Once sheep populations are established, monitoring studies will enable a better definition of sheep use areas and consequently the 2-mile provision may not necessarily apply to all the above areas. This provision does not apply to waters proposed in Grama, Hacks, or Kanab Creek Canyons.

2. Determine if livestock-bighorn sheep conflicts occur and resolve the conflicts under multiple-use guidance.

   Livestock numbers will continue to be monitored on the basis of range utilization levels and trend; however, use patterns and season of use may be looked at and acted on to alleviate or mitigate possible conflicts. It is not expected nor is it proposed that livestock numbers be reduced.

3. Encourage energy and mining companies to avoid exploratory activities in critical sheep habitat areas during critical times, e.g. lambing grounds during lambing season and watering sites during late spring and early summer.

   This involves working with companies on a case-by-case basis in a voluntary effort to minimize impacts on sheep. This recommendation in no way implies limitations on actual mining operations but does recommend voluntary accommodation in regards to exploratory activities.

4. Discourage backpackers from camping in tributary canyons of the Paria Canyon where water is available for sheep, particularly at Wrather and Bushhead Canyons. Other side canyons may also be considered if monitoring studies show that sheep are keying in on certain canyons.

   Bighorns are expected to select side canyons such as those listed above because of the juxtaposition of forage, water, and escape cover. These canyons are narrow and consequently campers may disrupt sheep watering or lambing. It is not expected that the current level of hiking activity will disrupt bighorn sheep.

5. Do not allow a change from the existing livestock class to domestic sheep within 20 miles of desert bighorn sheep habitat.

B. Purpose and Need

The purpose of the "proposed actions" is to reestablish native fauna in historic habitat to increase and diversify the resource values of the lands in question. The successful reestablishment of desert bighorn sheep in the aforementioned areas is just one additional step in attempting to turn around the overall existing downward trend of desert bighorn sheep in the Southwest.

Because bighorn sheep populations are currently high in the Black Mountains of Arizona, an opportune time exists to obtain bighorn for such transplants. There is fear among some Arizona Game and Fish Department personnel (personal communication) that a winter die-off may occur in the Black Mountains if excess animals are not removed, and consequently bighorn may not be as available for future transplant programs.

C. Alternatives

1. Do not transplant the desert bighorn sheep to either area.

   This alternative may cause some loss of sheep through die-off in the Black Mountains as approximately 200 excess sheep must be removed to alleviate potential die-off problems next winter. The proposed release sites are some of the few available habitats left within Arizona for Nelsonii bighorn sheep.

2. Transplant sheep to only one of the two areas.

   Desert bighorn now occur in the lower Kanab Creek drainage from Chamberlain Canyon southward. Past records show that sheep occurred at least to the mouth of Grama Canyon. The retrenchment of sheep habitat is probably a result of past human activity. Historic desert bighorn records for Paria are more sketchy but ram sightings were reported to Paria Canyon in October and November 1982. Habitat is available in both areas.

3. Reduce the number of sheep to be managed in Kanab Creek (130) and Paria (175) to a significantly lower figure.

   Conflicts between bighorn sheep and livestock will probably not be over forage as adequate forage is available for sheep in areas inaccessible to livestock. Use patterns may cause more conflicts not based so much on forage consumption as on spatial distribution of livestock and sheep. If sheep numbers are cut in half, the same concerns and conflicts may still exist.

II. EXISTING ENVIRONMENT

A. Non-Living Components

1. Air

Air quality is good within the proposed bighorn sheep release sites with a quality rating of Class I in Paria Canyon and the Vermillion Bench and Class II for the Hacks Canyon-Kanab Creek area. Other sheep habitat areas such as Thousand Pockets and the rim of Vermillion Cliffs fall under Class IV.

2. Land

Three major land uses occur within the proposed sheep habitat management areas: livestock grazing, minerals, and recreation. Livestock grazing exists primarily on the rim tops and canyon bottoms. Some livestock use occurs on the alluvial fans but generally use is light and somewhat sporadic. Livestock better utilize the alluvial fans of Kanab Creek than those of the Vermillion Bench and Paria Canyon. Livestock class plays a key role in how well the alluvial fans are utilized. Horses tend to work the alluvial fans better than cattle and consequently horse allotments such as Gulch and Kanab Gulch will have more use on the alluvial fans. The talus slopes (which are steeper and higher on the cliff structure) receive virtually no livestock use. Within the Paria area, the only talus or alluvial fan areas to receive significant livestock grazing are the lower 6 miles of Paria Canyon and the lower portion of the Vermillion Bench east of Soap Creek Springs. Within the latter area, livestock seldom use the areas directly below the cliffs and are generally confined to the relatively flat areas along the outer reaches of the "bench". Livestock use along the rim tops, except for a few areas near water, are generally

light due to distance of livestock waters from these areas. Overall, livestock use within the proposed bighorn sheep habitat management areas is generally confined to the canyon bottoms where the terrain is more conducive to livestock movement and distribution.

Mineral activity has greatly expanded in scope and intensity during the past several years. Of all the land uses occurring in or near bighorn sheep habitat, mineral activity has greatest potential for conflict with sheep habitat management goals primarily due to the increased activity and human access. The proposed management goals have taken this into consideration and consequently the delineation of the sheep habitat area boundaries were retrenched to exclude those areas where the greatest activity or potential activity is expected to occur.

At present, most mineral activity is centered around Hacks Mine (in Hacks Canyon at T. 37 N., R. 4 W., sec. 30 SW), Pigeon Mine (along the side of Snake Gulch, Utah, T. 39 N., R. 2 W., sec. 5), and Kanab North (at T. 38 N,. R. 3 W., sec. 20 SW). Most exploratory drilling has and is occurring on both sides of Kanab Creek north of Grama Point (Local Point). Exploratory activities are not limited to these areas and consequently may occur from time to time within sheep habitat management area boundaries.

Presently, there is no mineral activity occurring within the Paria or Vermillion Bench area though there is some interest in redeveloping the Sun Valley Mine claim at T. 38 N., R. 6 E., sec. 6, SW.

Recreational use is covered under the Wilderness and Recreation section.

3. Water

Water has generally been a scarce resource within the southwest and is no less important within bighorn sheep habitat. Water resources within the areas of the proposed actions include one perennial stream and more than 40 springs and seeps. See Appendixes I, II, and III for a detailed list and other pertinent data for the springs and seeps.

The Paria River is the only perennial stream within the HMP area and drains 3,652 square kilometers before entering the Colorado River at Lees Ferry. Within Arizona it runs approximately 35 miles. In reaches north of the stateline, the river is sometimes intermittent, however Buckskin Gulch and several perennial springs and seeps feed the Paria mainstream yearlong.

Waters of the Paria River are visibly turbid yearlong due to the continual transport of suspended particles. Waters are typically hard (>300 mg/l as $CaCO_2$) with high sulfate levels (>90 mg/l). Though the waters are well oxygenated, alkalinity is high. Water temperatures range from freezing to 35°C.

The Paria River is characterized by two basic habitat types: runs and riffles. Pools are rare and sporadically occur along some cliff faces or adjacent to large boulders. Maximum depths average 0.2-0.5 meters.* Runs are most common and are shallow (0.18 ± 0.05 m) and narrow (2.52 ± .077 m) with a low stream gradient. Runs typically occur over sandy bottoms with a moderate flow velocity of 0.34 ± 0.11 m/s. Stream velocities over riffles are generally swifter (0.45 ± 0.25 m/s) and more turbulent. Stream widths and depths on riffles average 2.99 ± 0.76 m and 0.15 ± 0.06 m, respectively. Stream gradients are generally higher over riffles than runs and bottom substrata is larger, consisting of gravel and rubble. Mean flow in the Paria River as measured near Lees Ferry at the U.S. Geological survey Gauging Station averages 0.84 ± 0.32 cubic meters per second over a 51-year period. However, stream discharge has varied from 0.0008 m^3/s to a maximum discharge of 456 m^3/s which occurred in 1925.

Precipitation is quite variable with a range of 6 to 8 inches in the canyon bottoms to 10 to 14 inches on the rim tops. Though precipitation generally occurs throughout the year, summer showers in July and August, and winter precipitation make up most of the yearly total precipitation and consequently have the greatest impact on forage production.

B. Living Components

1. Plants

Fourteen vegetative types exist within bighorn sheep habitat as covered in this analysis. The types are distinguished primarily by dominant and co-dominant shrubs except when grass makes up more than 10 percent of the total ground cover. Table I lists the vegetation types and their general locations. For more detail see the Paria-Kanab Creek Habitat Analysis. Plant species occurrence may be found in Appendixes.

There is only one threatened and endangered plant species that may occur within the identified sheep habitat and that is Pediocactus bradyi which is known to occur in the Lees Ferry area. Other plant species that are candidates for listing and occur or may occur within sheep habitat are:

Astragalus striatiflorus
Encelia frutescens var. resinosa
Fraxinus cuspidata var. macropetala
Eriogonum hermannii var. subracemosum
Coryphantha missouriensis var. marstonii
Eriogonum zionis var. coccineum
Rosa stellata

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*The stream characteristics are based upon an aquatic inventory conducted by AG&FD and BLM personnel in May 17-21, 1982, using 15 sample stations, and is only a one point in time sample. River characteristics may fluctuate over time.

Table I
VEGETATIVE TYPES AND LOCATIONS

VEGETATIVE TYPE	LOCATION
Blackbrush	Vermillion Bench, Paria Canyon, Thousand Pockets, Hacks Canyon, Kanab Creek
Blackbrush-Desert Shrub	Vermillion Bench
Blackbrush-Shadscale	Vermillion Bench
Ephedra	Paria Plateau adjacent to Paria Canyon
Saltbush	Paria Canyon
Half Shrub-Desert Shrub	Paria Plateau, Grama Canyon, Hacks Canyon
Sagebrush	Paria Plateau along Vermillion Cliffs and along the Kanab Creek rim
Sagebrush-Desert Shrub	Along the rim of Kanab Creek and tributaries and upper talus slopes
Desert Shrub	Paria Plateau, Vermillion Bench, and talus of Kanab Creek
Grassland-Desert Shrub	Sunshine Point and talus slopes of Grama and Hacks Canyons
Oak-Desert Shrub	Kanab Creek Esplanade, Thousand Pockets, and rim of Paria Canyon
Mountain Shrub	Thousand Pockets and Vermillion Cliffs
Riparian	Paria River
Floodplain	Grama and Hacks Canyons

2. Animals

In addition to cattle and horses, mule deer are found in limited numbers throughout sheep habitat in both the Paria and Kanab Creek areas. Desert bighorn sheep occur in lower Kanab Creek from Chamberlain Canyon south. At least one bighorn ram was observed several times in Paria Canyon near Judd Hollow and Wrather Canyon in October and November 1982. Table II lists animals that are known or expected to occur at least seasonally within or near the identified bighorn sheep habitat. Since little inventory work has been done in these areas, a lot is not known about species occurrence. It is expected that some species variation may occur due to geographic isolation mechanisms.

Listed T & E species within the HMP area includes the bald eagle and peregrine falcon. Both occur as occasional winter migrants. Peregrines are known to nest in Marble Canyon which is administered by Grand Canyon National Park and is located adjacent to House Rock Valley. Adult peregrines have been observed displaying terrestrial behavior in Paria Cayon and on

Table II
ANIMAL OCCURRENCE

Carnivores

Coyotes
Bobcat
Mountain lion
Gray fox
Ringtail
Raccoon
Spotted skunk
Striped skunk
Badger

Other

Beaver
Black-tailed jackrabbit
Porcupines

Small Game

Chukar partridge
Mourning dove
Various waterfowl
Desert cottontail

Small Mammals

White-tailed antelope ground squirrel
Kangaroo rat
Deer mouse
Wood rat
Montane vole
Pocket mouse
Grasshopper mouse
Pallid bat
Rock squirrel
Spotted bat
Canyon mouse
Pinyon mouse

Raptors

Red-tailed hawk
Rough-legged hawk
Golden eagle
American kestrel
Bald eagle
Peregrine falcon

Raptors (cont.)

Prairie falcon
Cooper's hawk
Sharp-shinned hawk
Great horned owl
Long-eared owl
Screech owl
Pygmy owl
Turkey vulture
Burrowing owl

Non-Game Birds

Ash-throated flycatcher
Gray flycatcher
Mountain chickadee
Plain titmouse
Gray vireo
Black-throated grey warbler
Chipping sparrow
Common bushtit
White-breasted nuthatch
Horned lark
Black-throated sparrow
Brewer's sparrow
Western meadowlark
Mockingbird
Costa's hummingbird
Lark sparrow
Loggerhead shrike
Gray vireo
Blue-gray gnatcatcher
Cassin's kingbird
Killdeer
Common snipe
Belted Kingfisher
Black-chinned hummingbird
Broad-tailed hummingbird
Common flicker
Pinyon jay
Scrub jay
Western kingbird
Say's phoebe
Black phoebe
House wren
Western blackbird
Junco

Lizards

Chuckwalla
Spiny lizard
Side-blotched lizard
Collared lizard

Amphibians

Great Basin spadefoot toad
Red-spotted toad
Woodhouse's toad
Great Plains toad
Canyon tree frog
Leopard frog

Snakes

Red racer
Striped whipsnake
Sonora and Great Basin gopher snake
Mojave patchnose snake
Kingsnake
Black-tailed rattlesnake
Great Basin rattlesnake

Fish of Paria River

Speckled dace
Bluehead Mountain sucker
Flannelmouth sucker
Carp

Forest Service lands in Kanab Creek. Although active nests have never been confirmed, it is believed that nesting is occurring in these areas.

C. Ecological Interrelationships

The existing environment contains a number of animals that depend upon forage or each other for their livelihood. The single most important factor for all animal life is the quality and quantity of vegetation which is used for food by some animals and for both food and cover by others. There are other animals that feed on the animals that feed on the vegetation. Consequently, forage resource are very important in providing a basis for supporting a well balanced and diversified animal resource.

Within the Paria and Kanab Creek areas, forage is generally in good to excellent condition with the exception of canyon bottoms. Here, past overgrazing by livestock along with occasional droughts have reduced forage production. However, reduced livestock pressure, a change in season of use, and good precipitation have greatly improved the forage condition of the canyon bottoms over the past few years. Deer use has generally been light with most use occurring along the rim tops. The talus slopes receive very little use by large ungulates, as most slopes are inaccessible to livestock and deer use is very sporadic. Desert bighorn sheep use in lower Kanab Creek is not well documented, but it appears that the sheep key-in on the upper talus slopes during the summer and travel to the canyon bottoms for water at one of several springs. It is expected that sheep move to the alluvial fans at the base of the cliff structures during winter and early spring to take advantage of milder climatic conditions and early forage green-up. If any ecological conflicts occur between sheep and livestock, winter and spring may be the most pronounced time of conflicts. In early spring, both may actively select cool season plants such as Poa spp., Indian ricegrass, needle and thread grass, and wild rye. These plants generally "green-up" earlier in the canyon bottoms and alluvial fans than in the higher talus slopes. However, since livestock use in the alluvial fans is light, existing conflicts for the same resource may only be slight. A lot depends on whether the forage is adequate for sheep in places where livestock do not graze. It appears through the vegetative data that the forage is more than adequate and cool season grasses occur in greater abundance and diversity in talus slopes than on the canyon bottoms. There is also some conflict for forage between sheep and deer, however, because deer numbers are low the existing conflicts are insignificant.

Factors that may affect the ecological balance include both natural and man induced. Severe extended droughts that cause a reduction in forage abundance and diversity would put increased pressure on available forage between different animals such as livestock, bighorn sheep, and deer. Under such conditions, even small mammals such as rabbits and rodents could well be in conflict with ungulates for available forage.

Man induced factors include livestock grazing and mineral activity. Man can change the ecological balance simply by changing the season of use of livestock grazing or the class of livestock. For example, if a grazing system was changed from winter use to spring use, an adverse impact could be made on cool season grasses over a long period of time and consequently the vegetative resource may shift more towards a warm season regime. A change from cattle use to horse use could reduce grazing pressure on canyon bottoms but increase use on alluvial fans. A change in class to domestic sheep could greatly impact bighorn sheep because domestic sheep would have more access to areas not now utilized by cattle or horses, and of even greater consequence, could transmit disease vectors that bighorn sheep have little or no resistance to.

Mineral activities may have direct and indirect influences on ecological interrelationships. Direct influences include actual habitat destruction via the construction of drilling pads, mining operation sites and roads. Indirect influences are primarily concerned with disturbance factors such as increased human use that may result in either direct or indirect harassment on wildlife species.

An increase in wildlife species could increase competition for forage near the canyon bottoms particularly between livestock and bighorn sheep. Likewise, a decrease in predators could result in an increase in calf crops, a higher recruitment for bighorn sheep, and an increase in rodent and lagomorph populations. An increase in the latter could create additional competition for forage.

One important factor that has so far not been considered is the availability of niches or habitat that contain all the necessary requirements for a wildlife population to carry on its life cycle. It is thought bighorn sheep populations at one time were much higher and occupied a much greater area than now occurs. Past overgrazing by domestic sheep along with disease transmission are thought to have been major reasons for the decline of bighorn sheep within the Paria and Kanab Creek areas. The decline and retrenchment of bighorn sheep populations has resulted in the nonuse of what was at one time bighorn habitat. This habitat is still available along the talus slopes and alluvial fans of both the Paria and Kanab Creek areas. Bighorn sheep use of the talus slopes would create little in the way of interspecies competition as these slopes are most suited as sheep habitat.

D. Human Values

1. Visual Resources

High plateau surrounded by deep, rugged, red sandstone canyons typify the area where the sheep will be released. Some of the most spectacular scenery on the Arizona Strip encompasses the project area. The towering Vermillion Cliffs and the Paria Canyon are designated VRM Class I which provides for high protection of scenic values. Kanab Creek is Class II, Thousand Pockets is Class III and the Paria Plateau is Class IV. which is the least protective of the visual resources.

2. Social-Eonomic Interests

Three major economies exist in neighboring communities that may play an important role in the public's attitude towards bighorn sheep transplants. Livestock operations have had a long history in the area and provide an important economic base for Kanab and Fredonia. Livestock operators and those dependent upon the livestock industry would have serious concerns in regards to how the bighorn sheep transplants and management will affect their industry. The mining industry has greatly expanded their role in the economies of Kanab and Fredonia in the last three or four years and consequently any action that might have adverse impacts on the industry would generate concerns. Tourism is the third key economic base for Kanab and Fredonia and also Page and Marble Canyon. Though tourism would not be affected either way, it is expected that there would be little or no concern regarding sheep transplants. However, public attitudes towards the establishment of bighorn sheep populations is considered to be very positive overall.

3. Wilderness and Recreation

The proposed sheep release in Bushhead Canyon and alternative release sites on the Vermillion Bench are located in the Paria Canyon and Vermillion Cliffs Instant Study Areas respectively. The suitability report for these ISAs has been completed and a preliminary recommendation made to include 84,389 acres in a Paria Canyon Wilderness Area.

Though most of the area receives some recreational use such as backpacking, hunting, and sightseeing, the only area to receive significant use is Paria Canyon. The Paria Canyon has become increasingly popular with backpackers due to its isolation and unique beauty as publicized in several publications including Arizona Highways. The number of visitors has more than tripled between 1971 and 1981 from 506 to 1,671. In 1981, 15,679 visitor days were recorded, with 38 percent use occurring in May and June and 40 percent occurring in March, April, and October.

The proposed release site in Hack Canyon is in the Hack Canyon Wilderness Study Area. The final wilderness recommendation for this unit has not been made; however, the Proposed Action in the Arizona Strip Wilderness Study Areas draft EIS found 12,531 acres as suitable for wilderness designation.

Hack Canyon is a major access route used by hikers to get into Kanab Creek. The area is remote and does not receive much use. The whole Kanab Creek area was visited by only 251 individuals in 1980 and 269 individuals in 1981.

Wilderness studies have identified protection of bighorn habitat as a benefit of wilderness designation for both the ISAs and WSA involved in these releases.

4. Cultural Resources

Cultural resources within the HMP area include Anasazi prehistoric Indian sites, Paiute Indian sites, early Mormon pioneer settlements such as Jacob's Pools, the Honeymoon Trail, and Dominguez-Escalante Trail.

III. ANALYSIS OF THE PROPOSED ACTION AND ALTERNATIVES

A. Environmental Impacts

1. Anticipated Impacts

a. Proposed Action

(1) Approximately one acre will be slightly impacted along the access route and the holding paddock in Hacks Canyon.

(2) Approximately one-tenth acre will be slightly impacted at the Bushhead Canyon release site due to the construction of the holding paddock.

(3) A temporary noise impact may occur during the use of a helicopter for hauling in the paddock materials and again for the release of sheep and removal of the paddock materials.

(4) Vegetation that now receives little or no use by ungulates on the talus slopes of Paria Canyon, Vermillion Bench, Hacks Canyon, Water Canyon, Grama Canyon and Kanab Creek will be grazed lightly by bighorn sheep. A few plants such as single-leaf ash may occasionally receive high use.

(5) The establishment of bighorn sheep in the proposed areas will enhance the recreational opportunity of backpackers and hunters.

(6) The sheep release will have slight impacts on naturalness. This results from the confinement of sheep in temporary pens, cross-country vehicle travel, and concentration of human activity in the areas. Establishment of a bighorn population will enhance wilderness quality by increasing supplemental values. In addition to their scientific and educational value, opportunities for observation and hunting will be created.

(7) The proposed action may affect the grazing system or season of use of the following allotments: Vermillion, Badger Creek, Hacks, Water Canyon, Kanab, and Kanab Gulch. Potential conflicts are unknown and may not even exist. If conflicts do occur, a change

in the grazing system or season of use may be used to resolve those conflicts. Livestock reductions would not be necessary or appropriate. The sheep will be monitored to determine if indeed there are conflicts.

(8) Some soil compaction and degradation to the vegetation may occur around key "water holes", lambing grounds, or bedding areas; depending on sheep dispersion and movements.

(9) Livestock distribution may not be improved to the extent possible in a few cases.

(10) Some livestock operators perceive that their operations will be negatively impacted.

(11) The reestablishment of desert bighorn sheep will enhance the wilderness values of the proposed areas if they are designated wilderness.

(12) There will be increased consumptive and non-consumptive recreational opportunities.

(13) Increased economic opportunity could be realized eventually through hunting guide service. (Bighorn sheep hunter days are valued at $400/day).

(14) T&E animals and plants will not be impacted by the proposed actions.

(15) The bighorn sheep release sites and access routes have been inventoried and found not to contain cultural resources that may be impacted by the proposed actions.

b. Alternative Actions

Alternative #1

Do not transplant desert bighorn sheep to either area.

(1) The opportunities for the enhancement of wildlife opportunities will not be realized as available habitat will continue to be unused.

(2) A surplus population of bighorn sheep exists in the Black Mountains of Arizona of which a high winter mortality could be expected if enough of these animals are not transplanted.

Alternative #2

(1) This would reduce some of the potential conflict between bighorn and livestock if indeed conflicts will arise.

(2) This does not address the fact that good sheep habitat is available in both areas of which most of the habitat is in terrain inaccessible to livestock.

Alternative #3

(1) If conflicts occur between bighorn sheep and other activities, a reduction in numbers would not necessarily reduce conflicts as the conflicts will probably be over use patterns and not animal numbers.

2. Possible Mitigating or Enhancing Measures

a. Proposed Action

(1) The access route to the Hacks Canyon release site should only be improved using hand tools and only to the degree absolutely necessary.

(2) Construct the release paddocks by hand and remove only that vegetation necessary for the construction of the paddock.

(3) Broadcast a seed mixture of galleta grass, drop seed, and fourwing saltbush at the rate of 10 lbs/acre on the access route and any other disturbed area after the paddocks are removed.

(4) Paria Canyon hikers will be notified that a helicopter will be used in the canyon.

(5) The Superintendent of Glen Canyon National Recreation Area will be notified 48 hours in advance of helicopter use.

(6) Livestock waters proposed within 2 miles of bighorn sheep habitat will be analyzed on a case-by-case basis to determine if the benefits to livestock management outweigh the need to protect bighorn sheep habitat.

3. Recommendations for Mitigation or Enhancement

Incorporate all of the above mitigating measures.

4. Residual Impacts

a. Bighorn sheep will feed on vegetation that currently does not receive any grazing pressure.

b. Undefined or unknown impacts on livestock operations may still occur.

c. Some soil compaction and vegetative degradation may occur as the result of concentrated sheep use around waters or other key areas.

d. Some livestock operators perceive that their operations will be negatively impacted.

e. The reestablishment of desert bighorn sheep will enhance the wilderness values of the proposed areas if they are designated wilderness.

f. There will be increased consumptive and non-consumptive recreational opportunities.

g. Increased ecnomic opportunity could be realized eventually through hunting guide service. (Bighorn sheep hunter days are valued at $400/day).

B. Relationship Between Short-Term Use and Long-Term Productivity

The proposed action increases the productivity of the area in question both during the short term and long term. Areas not now being used by livestock or big game will be used on a sustained basis thus enhancing multiple-use values of the land without significantly impacting any particular use.

C. Irreversible and Irretrievable Commitments of Resources

There are no commitments of resources that are either irreversible or irretrievable.

IV. PUBLIC PARTICIPATION

The following persons, groups, and government agencies have been consulted:

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V. INTENSITY OF PUBLIC INTEREST

Thirty-eight copies of the draft EA were sent to individuals, interest groups, and government agencies for review and comment. An additional three people were contacted personally. Seven written and seven verbal replies were received that varied from total support to opposition of the proposed action. Several of the comments were incorporated directly in the EA. Other comments are listed and addressed below. (See Appendix VII for written comments received from interested individuals and parties).

Comment: "The areas to the west of Willow Springs in Hack Canyon and the areas within Grama Canyon are areas of significant uranium potential in which exploration and mining development activities can be expected to increase.... Because of the likelihood of mineral use conflicts in these areas, they should not be included in the habitat management area."

The sheep habitat area boundaries within Grama and Hacks Canyons were developed after consultation with Energy Fuels Nuclear personnel. Those areas already being intensively explored for minerals were deleted from the proposed action along with several additional miles of sheep habitat where it was indicated that exploratory activities could be expected to occur. The proposed actions were changed to more accurately reflect the resolution of potential conflicts. Under BLM multiple-use policies, one use will not necessarily preclude another use or resource enhancement opportunity. We have analyzed the situation and found that the proposed actions will not significantly impact existing or future exploratory and mining activities.

Comment: "Bighorn sheep will pollute the culinary water supply at Soap Creek and Cottonwood Springs."

Upon inspection of Cottonwood Spring it was found that no surface water exists that would create a potential for water pollution. The analysis of the situation at Soap Creek Spring reveals that the potential for pollution of the water would exist whether bighorn sheep were reintroduced to the area or not.

Comment: "...'past overgrazing by domestic sheep along with disease transmission are thought to have been major reasons for the decline (of bighorn sheep populations)...'. What evidence is there that introduced sheep will not be susceptible to population threatening disease and epizoutics transmitted by domestic and feral livestock presently within these areas? Should disease transmission become a problem, how will it be identified and how will the consequences be evaluated?"

Conditions have dramatically changed since the days that domestic livestock were first introduced into bighorn sheep habitat. Range conditions have been improved in conjunction with more intensive and better range management. Domestic sheep which tend to transmit disease more potent to bighorn sheep no longer occur within bighorn sheep habitat on the Arizona Strip. No known feral livestock occur in the proposed transplant areas. And lastly, cattle are better managed and treated for disease control today than ever before. Of the three previous bighorn sheep releases made in the Virgin Mountains since 1979, no known livestock diseases have been transmitted to bighorn to date, though some of the released sheep already had pneumonia when they were captured. To date, the sheep releases on the Arizona Strip have been very successful with no evidence of livestock disease transmission occurrence. However, this is not to say that disease transmission will never be a problem in the future. We believe that the potential for successful reestablishment of bighorn sheep in historic habitat outweighs any threat of disease problems. The AGFD will radio collar four to five sheep in each release and conduct aerial surveys as needed to determine sheep movement and

survival rates. Deaths will be documented as to cause when possible. Any evaluation of mortality problems is the responsibility of the AGFD and is not a part of the proposed action.

Comment: "Does the BLM intend to expend the resources necessary for monitoring as identified in the assessment? Although the sheep are available for transplant this year it seems unfortunate to make a transplant if these sheep cannot be adequately monitored to determine the causes of future success or failure."

Both AGFD and BLM will monitor the situation at the proposed sheep habitat areas as manpower and funding allows. Outside of AGFD's plans to radio collar some sheep and conduct aerial and ground surveys and BLM's plans to document sheep habitat use patterns, there are no plans to conduct indepth research projects. We will collect fecal data and establish a few vegetative monitoring plots in addition to using existing range monitoring studies already established. If unforeseen problems arise, additional studies may be established by AGFD, BLM, or both agencies to collect site-specific data needed to resolve or answer a particular problem.

Comment: "Sheep will roam across 440 acres of private land and may step on exposed water pipelines near Soap Creek Spring on public lands which may cause breaks in the line."

Bureau personnel met with the concerned individuals regarding the above on July 26, 1983. The meeting concluded with the understanding that the impacts would be insignificant.

Comment: "The AGFD could have a special hunt to reduce the population of bighorn sheep in the Black Mountains rather than transplant them to the proposed areas."

Though this is feasible, it would be contrary to the AGFD's long term goal of reestablishing desert bighorn sheep to historic habitat within Arizona. It is common practice to use areas with surplus populations as the core for transplanting programs. It would also be unpopular with the public to issue hunting permits for ewes which would be necessary to dramatically reduce the population surplus.

Comment: "The proposed actions do not consider the affect on private holdings such as water and salt."

This comment refers to water rights on public lands that are held by livestock permittees. It is and has been Bureau policy that though water filings may be owned by private individuals for beneficial use, wildlife are to be provided safe access to waters on public lands. There is no way of controlling wildlife use of salt that is put on public lands unless the salt is located in areas where wildlife don't have access. Bighorn sheep consumption of water is about 3 gallons per day during hot dry weather. At other times water may not be used at all. If sheep use on water becomes substantial to the point that it creates water shortage problems the Bureau will take the necessary actions to alleviate the problems.

Comment: A few comments imply that the Bureau wants to cut livestock permits, change the season of use for livestock and eventually do away with grazing in Grama and Hacks Canyons.

The EA specifically states that livestock numbers will not be reduced due to bighorn sheep. Range monitoring studies, as written in the Vermillion Grazing EIS and allotment management plans, will continue to be used to determine livestock numbers. There are no plans to discontinue grazing in any of the proposed sheep habitat areas.

Comment: The proposed action to discourage new livestock waters within 2 miles of bighorn sheep habitat is too restrictive and is contrary to recommended projects in some AMPs.

The proposed action states to "discourage" and implies that each proposed livestock water will be evaluated on a case-by-case basis. Currently, there are only two proposed waters that may be in possible conflict with this proposal.

Appendix I
KANAB CREEK SPRINGS

SPRING NAME	LOCATION	DEV. OR UNDEV.	FLOW RATE	TDS
Gramma Spring	T37N, R3W, SW1/4, Sec. 19	Developed	.4	1,105
Willow Spring	T37N, R4W, NE, Sec. 33	Developed	.4	1,340
Water Canyon Spring	T36N, R4W, SW NE Sec. 7	Developed	.47	1,170
Seep	T36N, R4W, Sec. 7 center of W1/2	Undeveloped	.1	-
Bessie Spring	T36N, R4W, Sec. 23 SE, SE1/4	Undeveloped	.5-1	650
Daves Spring	T36N, R4W, SW, SW1/4, Sec. 30	Undeveloped	.75-1	1,430
Dripping Spring North (NPS)	T35N, R4W, SW SW1/4, Sec. 12	Undeveloped	.5-1	1,750
Dripping Spring South (NPS)	T35N, R4W, NW, NW1/4, Sec. 13	Undeveloped	.5-1	2,275

Appendix II
PARIA CANYON SPRINGS

NAME	LOCATION	DEV. OR UNDEV.	FLOW RATE	TDS
Wrather Canyon Spring (mouth and source)	T41N, R6E, Sec. 8 Two sources: one at mouth of canyon and one at head	Undeveloped	3-5	
Last Spring	T41N, R6E, Sec. 15	Undeveloped	Main: 1-2 Second: 2-3	104
Bushead Canyon Spring (two sources: one at mouth and one at head of canyon)	T41N. R6E. SE. NE. Sec. 23 (upper) T41N, R6E, NE, NE, Sec. 23	Undeveloped	5-7	-
Spring	T41N, R7E, NW1/4 Sec. 34	Undeveloped	5-10	650
Wilson Spring	T41N, R7E, SW1/4 Sec. 34	Developed	5-7	299
Wilson Canyon Seeps (upper and lower)	T40N, R7E, Sec. 4 NW, NW, Sec. 5 NE	Undeveloped	?	-

Appendix III
VERMILLION CLIFFS AND BENCH SPRINGS

SPRING NAME	LOCATION	DEV. OR UNDEV.	FLOW RATE	TDS
House Rock Spring (Brown Spring) (private)	T39N, R3E, NW, SW1/4, Sec. 13	Developed		
Parker Spring (public)	T39N, R4E, NW, NW1/4, Sec. 30	Developed		
Cottonwood Springs #1 and 2	T39N, R4E, Sec. 27 NW NE of NW or Sec. 21 SE SE	Was developed at one time.		
Banal Spring (public)	T39N, R4E, Sec. 22 SE SE SW or SE SW SE	Was developed at one time.		
Spring	T39N, R4E, Sec. 36 NE NW			
Jacob Cliff Spr. (main source)	T39N, R5E, SW, NE, NW, Sec. 31	Developed	1-2	215
Jacob Cliff Spring--North	T39N, R5E, SE, NW, NW, Sec. 31	Undeveloped	.5-1	-
Jacob Cliff Springs--East	T39N, R5E, SW, NE, NW, Sec. 31	Undeveloped	.5	-
Jacob's Pool (corral)(private)	T38N, R5E, NW, NE, SW, Sec. 6	Developed	1.5	266
Jacob Chinle Seep (private)	T38N, R5E, NW, NE, Sec. 6	Developed, abandoned.	.5	-
Jacob Willow Spring (private)	T38N, R5E, NW, NE, Sec. 6	Developed	1-2	260
Jacob Chinle Spring (private)	T38N, R5E, SE, NW, NE, Sec. 6	Developed	1-2	224
Seep (Mill Site Spring) (private)	T38N, R5E, Sec. 5 SW, NW1/4			
Sunset Spring (public)	T38N, R5E, Sec. 5 SE, SW1/4			
Emmet Spring (private)	T38N, R5E, Sec. 8 SE, NE1/4	Developed		
Seep (public)	T38N, R5E, NW, NW1/4, Sec. 10	Undeveloped		
Seep (public)	T38N, R5E, Sec. 1 SW, NW1/4	Undeveloped		
Sunshine Mine Seep	T38N, R6E, Sec. 6 NW, NE, SW1/4	Undeveloped	25	-
Cottonwood Spring	T39N, R6E, Sec. 32 NE SW, NW1/4	Developed, all surface water removed		
Spring	T39N, R6E, Sec. 30 NW SW	Developed according to plat book with trough in SE corner of section		
Spring	T39N, R6E, Sec. 29 SE NW	Developed according to plat book		

Appendix III (cont.)
VERMILLION CLIFFS AND BENCH SPRINGS

SPRING NAME	LOCATION	DEV. OR UNDEV.	FLOW RATE	TDS
Seep	T39N, R6E, Sec. 29 NE NE NE			
Seep	T39N, R6E, E1/2 Sec. 19 (two possible seeps)			
Seep	T39N, R6E, Sec. 20 SW SE			
Soap Creek Spring (upper source)	T39N, R6E, Sec. 17 SW NE SE1/4	Developed	10-15	-
Soap Creek Spring (lower spring complex) 3-4 seeps in this general area	T39N, R6E, Sec. 21 NW, SW, E1/2, W1/2 W1/2, Sec. 21 (seep), Sec. 20, SE, SW, SE1/4 (seep), Sec. 29, NE, NE1/4 (seep), Sec. 29, SW, SE, NW1/4 (seep)	Developed	10	
Dutchman Spring	T39N, R6E, Sec. 10 somewhere in canyon northeast of Soap Point			
Seep	T39N, R6E, Sec. 2 NE NE SW	Undeveloped		
Seep	T39N, R6E, Sec. 2 N1/2 SW NE	Undeveloped		
Badger Creek Spring	Upper source: T40N R6E, SW, SE, Sec. 35; Lower source: T39N, R6E, NW, NE, Sec. 2	Developed	5-7	130
Spring	T40N, R6E, Sec. 36 NW SE			
Spring	T40N, R6E, Sec. 36 SE NE			
Lowery Spring	T40N, R7E, Sec. 30 SE,NE	Developed, three collection pts.	3.5	228
Fisher Spring (state)	Upper source: T40N R7E, SW, NE, Sec. 16; Lower source: T40N, R7E, SE, NE, Sec. 16	Undeveloped	1.5	Upper: 228 Lower: 325

Appendix IV
COMMON HYDROPHYTIC PLANT SPECIES OF THE PARIA-KANAB CREEK HMP AREA

ACERACEAE MAPLE FAMILY

Acer negundo, Box Elder

ASCLEPIADACEAE MILKWEED FAMILY

Funastrum heterophyllum, Climbing Milkweed

BORAGINACEAE BORAGE FAMILY

Hackelia floribunda, Stickseed

CAPPARIDACEAE CAPER FAMILY

Cleome lutea, Beeplant

COMPOSITAE SUNFLOWER FAMILY

Aster spinosus, Aster
Baccharis glutinosa, Baccharis
Pluchea sericea, Arrowweed

CYPERACEAE SEDGE FAMILY

Scirpus acutus, Bulrush
Scirpus americanus, Bulrush
Scirpus paludosus, Bulrush

EQUISETACEAE HORSETAIL FAMILY

Equisetum arvense, Scouring Rush
Equisetum hyemale, Common Scouring Rush

GRAMINEAE GRASS FAMILY

Agropyron trachycaulum, Slender Wheatgrass
Agrostis exarata, Spike Redtop
Agrostis semiverticillata, Bentgrass
Bromus marginatus, Bromegrass
Distichlis stricta, Saltgrass
Hordeum jubatum, Foxtail Barley
Hordeum leporinum, Foxtail
Phragmites communis, Common Reed
Poa pratensis, Bluegrass
Polypogon monspeliensis, Rabbitfoot
Puccinellia airoides, Alkaligrass
Puccinellia distans, Alkaligrass

JUNCACEAE RUSH FAMILY

Juncus balticus, Wire Rush
Juncus mertensianus
Juncus saximontanus, Rocky Mountain Rush
Juncus tracyi
Luzula multiflora, Wood Rush
Luzula parviflora, Wood Rush

Appendix IV (cont.)
COMMON HYDROPHYTIC PLANT SPECIES
OF THE PARIA-KANAB CREEK HMP AREA

LEGUMINOSAE PEA FAMILY
Glycyrrhiza lepidota, Licorice
LILIACEAE LILY FAMILY
Asparagus officinalis, Asparagus *Smilacina stellata*, False Solomon Seal
OLEACEAE OLIVE FAMILY
Fraxinus anomala, Single-leaf Ash
ORCHIDACEAE ORCHID FAMILY
Epipactus gigantea, Helleborine
PLANTAGINACEAE PLANTAIN FAMILY
Plantago eriopoda
POLYPODIACEAE FERN FAMILY
Adiantum capillus-veneris, Maidenhair Fern
RANUNCULACEAE BUTTERCUP FAMILY
Aquilegia micrantha, Columbine *Clematis ligusticifolia*, Virgin's Bower *Ranunculus cymbalaria*, Buttercup
SALICACEAE WILLOW FAMILY
Populus fremontii, Fremont Cottonwood *Salix exigua*, Sandbar Willow *Salix gooddingii*, Dixie Black Willow
SCROPHULARIACEAE FIGWORT FAMILY
Mimulus guttatus, Monkey Flower
TAMARICACEAE TAMARIX FAMILY
Tamarix pentandra, Tamarix
TYPHACEAE CATTAIL FAMILY
Typha domingensis, Cattail
ZANNICHELLIACEAE HORNED PONDWOOD FAMILY
Zanichellia palustris, Horned Pondweed

(D. M. Sullivan, 1977)

Appendix V
PARIA HABITAT AREA PLANT SPECIES LIST

ABRON	Abronia	Sandverbena	Forb
ACHIL	Achillea	Yarrow	Forb
AGAVE	Agave	Agave	Shrub
AMBRO	Ambrosia		Shrub
AMUT	Amelanchier utahensis	Serviceberry	Tree
ANDRO	Andropogon	Bluestem	Grass
ARENA	Arenaria	Sandwort	Forb
ARIST	Aristida	Threeawn	Grass
ARBI	Artemisia bigelovii	Bigelow sagebrush	Shrub
ARCT	Arctostaphylos sp.	Manzanita	Shrub
ARFI	Artemisia filifolia	Sand sagebrush	Shrub
ARLU	Artemisia ludoviciana	Louisiana sagewort	Forb
ARTR	Artemisia tridentata	Big sagebrush	Shrub
ASTRA	Astragalus	Locoweed	Forb
ATCA	Atriplex canescens	Fourwing saltbush	Shrub
ATCO	Atriplex confertifolia	Shadscale	Shrub
BAMU	Bailyea multiradiata	Desert marigold	Forb
BOCU	Bouteloua curtipendula	Sideoats grama	Grass
BOER	Bouteloua eriopoda	Black grama	Grass
BOGR	Bouteloua gracilis	Blue grama	Grass
CELA	Ceratoides lanata	Winterfat	Shrub
CELE	Cerococarpus ledifolius	Curl Leaf Mountain Mahogany	Shrub
CHNA	Chrysothamnus nauseosus	Rubber rabbitbush	Shrub
CHRY	Chrysothamnus		Shrub
CHVI	Chrysothamnus viscidiflorus	Green rabbitbush	Shrub
COLDE	Coldenia	Coldenia	Forb
CORA	Coleogyne ramosissima	Blackbrush	Shrub
COME	Cowania mexicana	Cliffrose	Shrub
CRYPT	Cryptantha	Cryptantha	Forb
DALE	Dalea	Indigo bush	Shrub
DYSSO	Dyssodia	Dogweed	Forb
ECHIN	Echinocereus or Echinocactus	Cacti	NSS
ELYMU	Elymus	Wildrye	Grass
ENCEL	Encelia	Brittlebush	Shrub
EPNE	Ephedra nevadensis	Nevada ephedra	Shrub
EPVI	Ephedra viridis	Mormon tea (green ephedra)	Shrub
ERIGE	Erigeron	Fleabane	Forb
ERCO	Eriogonum corybosum	Corymbed eriogonum	Forb
ERFA	Eriogonum fasciculatum	Flattop eriogonum	Forb
ERIN	Eriogonum inflatum	Desert trumpet	Forb
ERKE	Eriogonum kearnyi		Shrub
ERMI	Eriogonum microthecum	Slenderbush	Shrub
FAPA	Fallugia paradoxa	Apacheplume	Shrub
FRAN	Fraxinus anomala	Singleleaf ash	Tree
GAST	Galium stellatum	Desert bedstraw	Forb
GUSA	Gutierrezia sarothrae	Broom snakeweed	Shrub
GUMI	Gutierrezia microcephala	Matchbrush snakeweed	Shrub
HAPLO	Haploppus	Goldenweed	Forb
HEVI	Heterotheca villosa (Chrysopsis)	Goldaster	Forb
HIJA	Hilaria jamesii	Galleta	Grass

Appendix V (cont.)
PARIA HABITAT AREA PLANT SPECIES LIST

HIRI	Hilaria rigida	Big galleta	Grass
HYFI	Hymenopappus filifolisu	Fileleaf hymenopappus	Forb
JUOS	Juniperus osteosperma	Utah juniper	Tree
LOTUS	Lotus	Deervetch	Forb
LYCIU	Lycium	Wolfbery	Shrub
MATA	Machaeranthera tenacetifolia	Tansyleaf aster	Forb
MATO	Machaeranthera tortifolia	Mohave aster	Forb
MENTH	Mentha	Mint	Forb
MENTZ	Mentzelia	Stickleaf	Forb
MUPO	Muhlenbergia porteri	Bush muhley	Grass
MUTO	Muhlenbergia torreyi	Ring muhley	Grass
OENOT	Oenothera	Evening primrose	Forb
OPUNT	Opuntia	Cholla	NSS
OPUNT	Opuntia	Prickly pear	NSS
ORHY	Oryzopsis hymenoides	Indian ricegrass	Grass
PEAM	Penstemon ambiguus	Gilia penstemon	Forb
PETH	Penstemon thurberi	Thurber penstemon	Forb
PHLOX	Phlox	Phlox	Forb
PIED	Pinus edulis	Pinyon pine	Tree
POA	Poa	bluegrass	Grass
POIN	Poliomintha incana	Hoary rosemary mint	Shrub
PSORA	Psolalea	Scurt-pea	Forb
QUGA	Quercus gambelii	Gambel oak	Tree
QUTU	Quercus turbinella	Shrub live oak	Shrub
RHTR	Rhus trilobata	Skunkbush	Shrub
RUMEX	Rumex	Dock	Forb
SADO	Salvia dorrii	Purple sage	Shrub
SENEC	Senecio	Groundsel	Forb
SHEPH	Shepherdia	Buffaloberry	Shrub
SIHY	Sitanion hystrix	Squirreltail	Grass
SPHAE	Sphaeralcea	Globemallow	Forb
SPAI	Sporobolus airoides	Alkali sacaton	Grass
SPRO	Sporobolus contractus	Spike dropseed	Grass
SPER	Sporobolus cryptandrus	Sand dropseed	Grass
SPFL	Sporobolus flexuosus	Mesa dropseed	Grass
STANL	Stanleya	Princes plume	Forb
STEPH	Stephanomeria	Desert wire lettuce	Forb
STIPA	Stipa sp.	Needlegrass	Grass
STCO	Stipa comata	Needle and Thread	Grass
SWERT	Swertia	Swertia	Forb
THMO	Thamnosma montana	Turpentine	Shrub
TRPU	Tridens pulchellus	Fluffgrass	Grass
YUCCA	Yucca	Yucca	Shrub
ZYAD	Zygadenus	Deathcamas	Forb

1) If only genus is given there could be more than one species present or a particular plant was only identified to genus.

2) Does not include riparian vegetation which is under a different section.

Appendix VI
KANAB CREEK AREA PLANT SPECIES LIST

AGUT	Agave utahensis	Utah agave	NSS
ALWR	Aloysia wrightii?		Shrub
ANDRO	Andropogen	Bluestem	Grass
ARPE	Arabis perennens	Rockcress	Forb
ARENA	Arenaria	Sandwort	Forb
ARIST	Aristida		Grass
ARAR	Artemesia arbuscula	Low sagebrush	Shrub
ARBI	Artemesia bigelovii	Bigelow sagebrush	Shrub
ARLU	Artemesia ludoviciana	Louisiana sagebrush	Forb
ARTR	Artemesia tridentata	Big sagebrush	Shrub
ASCLE	Asclepias	Milkweed	Forb
ASTRA	Astragalus	Locoweed	Forb
ATCA	Atriplex canescens	Fourwing saltbush	Shrub
ATCO	Atriplex confertifolia	Shadscale	Shrub
BEFR	Berberis fremontii	Fremont barberry	Shrub
BOCU	Bouteloua curtipendula	Sideoats grama	Grass
BOER	Bouteloua eriopoda	Black grama	Grass
BOGR	Bouteloua gracilis	Blue grama	Grass
BRAT	Brickellia atractyloides	Spring brickellia	Shrub
BRLO	Brickellia longifolia	Longleaf brickellia	Shrub
BRRU	Bromus rubens	Foxtail brome	Grass
BRTE	Bromus tectorum	Cheatgrass brome	Grass
CAFL	Calohortus flexuosus	Weakstem mariposa lily	Forb
CASTI	Castilleja	Indian paintbrush	Forb
CELA	Ceratoides lanata	Winterfat	Shrub
CHRY	Chrysothamnus		Shrub
CHNA	Chrysothamnus nauseosus	Rubber rabbitbrush	Shrub
CHVI	Chrysothamnus viscidiflorus	Low rabbitbrush	Shrub
CIRSI	Cirsium	Thistle	Forb
COLDE	Coldenia	Coldenia	Forb
CORA	Coleogyne ramosissima	Blaackbrush	Shrub
COME	Cowania mexicana	Cliffrose	Shrub
CRYPT	Cryptantha	Cryptantha	Forb
DAME	Datura meteloides	Jimsonweed	Forb
DELPH	Delphinium	Larkspur	Forb
DYSSO	Dyssodia	Dogweed	Shrub
ECPO	Echinocactus polycephalus	Cottontop	NSS
ECHI	Echinocereus	Echinocereus	NSS
ELYMU	Elymus	Wildrye	Grass
ENFR	Encelia frutescens	Bush encelia	Shrub
EPNE	Ephedra nevadensis	Nevada ephedra	Shrub
EPVI	Ephedra viridis	Green ephedra	Shrub
ERIGE	Erigeron	Fleabane	Forb
ERCO	Eriogonum corymbosum	Corymbed eriogonum	Forb
ERIN	Eriogonum inflatum	Desert trumpet	Forb
ERMI	Eriogonum microthecum	Slenderbush eriogonum	Shrub
EROV	Eriogonum ovalifolium	Cushion eriogonum	Shrub
EUPHO	Euphorbia	Euphorbia	Forb
FAPA	Fallugia paradoxa	Apache plume	Shrub
FERU	Fendlera rupicola	Cliff fendlerbush	Shrub

Appendix VI (cont.)
KANAB CREEK AREA PLANT SPECIES LIST

GALIU	Galium	Bedstraw	Forb
GLNE	Glossopetalon nevadensis	Greasebush	Shrub
GRSP	Grayia spinosa	Spiny hopsage	Shrub
GUSA	Guttierrezia xanthocephalum sarothrae	Broom snakeweed	Shrub
HEVI	Heterotheca villosa	Hairy goldaster	Forb
HIJA	Hilaria jamesii	Galleta	Grass
HYME	Hymenopappus	Hymenopappus	Forb
HYCO	Hymenoxys cooperi	Hymenoxys	Forb
JUOS	Juniperus osteosperma	Utah juniper	Tree
LEPID	Lepidium	Pepperweed	Forb
LEAR	Lesquerella arizonica	Arizona bladderpod	Forb
LILE	Linum lewisii	Lewis flax	Forb
LUPIN	Lunipus	Lupine	Forb
LYCIU	Lycium	Wolfberry	Shrub
LYPA	Lycium pallidum	Pale wolfberry	Shrub
MATO	Machaeranthera fortifolia	Mohave aster	Forb
MIRAB	Mirabilis	Four-o-clock	Forb
MUHLE	Muhlenbergia	Muhly	Grass
MUPO	Muhlenbergia porteri	Bush muhly	Grass
MUPU	Muhlenbergia pongens	Sandhill muhly	Grass
OENET	Oenothera	Evening primrose	Forb
OPUNT	Opuntia	Cholla or prickly pear	NSS
OPCH	Opuntia chorotica	Pollarjoint prickly pear	NSS
OPER	Opuntia erinaceae	Grizzlybear prickly pear	NSS
ORHY	Oryzopsis hymenoides	Indian ricegrass	Grass
PASPA	Paspalum	Knotgrass	Grass
PENST	Penstemon	Penstemon	Forb
PEBA	Penstemon barbatus	Beardlip penstemon	Forb
PEWR	Perezia wrightii	Perezia	Forb
PETA	Petalostemum	Prairie clover	Forb
PHLOX	Phlox	Phlox	Forb
PIED	Pinus edulis	Pinyon pine	Tree
PLANT	Plantago	Plantain	Forb
POA	Poa	Bluegrass	Grass
POFE	Poa fendleriana	Mutton bluegrass	Grass
POSE	Poa sandbergii (secunda)	Sandberg bluegrass	Grass
PSCO	Psilostrophe cooperi	Whitestem paperflower	Shrub
PTPA	Ptelea pallida	Pale hoptree	Shrub
QUTU	Quercus turbinella	Shrub live oak	Shrub
RHTRT	Rhus trilobata	Skunkbush	Shrub
SCBR	Sclereropogon brevifolius	Burrograss	Grass
SHEPH	Shepherdia	Buffaloberry	Shrub
SIHY	Sitanion hystrix	Squirreltail	Grass
SPHAE	Sphaeralcea	Globemallow	Forb
SPAM	Sphaeralcea ambigua	Desert globemallow	Forb
SPCO	Sporobolus contractus	Spike dropseed	Grass
SPCR	Sporobolus cryptandrus	Sand dropseed	Grass
SPFL	Sporobolus flexuosus	Mesa dropseed	Grass
STPI	Stanleya pinnata	Desert princes plume	Forb

Appendix VI (cont.)
KANAB CREEK AREA PLANT SPECIES LIST

STEPH	Stephanomeria	Wireleltuce	Forb
STAR	Stipa arida	Mormon needlegrass	Grass
STCO	Stipa comata	Needle-and-thread	Grass
STNE	Stipa neomexicana	New Mexico feathergrass	Grass
STSP	Stipa speciosa	Desert needlegrass	Grass
SYMPH	Symphoricarpus	Snowberry	Shrub
TECA	Tetradymia canescens	Gray horsebrush	Shrub
THMO	Thomnosma montana	Mohave desertrue	Shrub
TRLA?	Tragia laciniata?	Noseburn	Forb
TRMU	Tridens muticus	Slim tridens	Grass
TRPI	Tridens pilosus	Hairy tridens	Grass
TRPU	Tridens puchellus	Fluffgrass	Grass
YUBA	Yucca baccata	Datil yucca	NSS
YUEL	Yucca elata	Soaptree yucca	NSS

DR #AZ-010-83-51
EA #AZ-010-83-362

EA DECISION RECORD

Desert Bighorn Sheep Transplants and Corresponding Provisions in Paria-Kanab Creek HMP

I. PROPOSAL

The Arizona Game and Fish Department in cooperation with the Bureau of Land Management proposes to transplant 20 to 40 desert bighorn sheep (*Ovis canadensis nelsoni*) on BLM-administered public lands within the Paria Canyon-Vermillion Bench area and Hacks Canyon. This initial action is preliminary to managing for an estimated eventual population of 175 sheep within the Paria Canyon-Vermillion Bench area and 130 sheep within the lower Kanab Creek drainage including public lands west of Kanab Creek, Hacks Canyon east of Hacks Mine, and the lower 3 miles of Grama Canyon.

The following recommendations proposed to facilitate the protection or enhancement of bighorn sheep habitat are analyzed in the EA for public comment. These recommendations apply only to public lands in Arizona.

A. Discourage the establishment of new livestock waters within 2 miles of the Paria Canyon, the Vermillion Cliffs, Grama and Hacks Canyon rims and Kanab Creek south of Grama Point.

B. Determine whether livestock-bighorn sheep conflicts occur and resolve any such conflicts under multiple-use guidance.

C. Encourage energy and mining companies to avoid exploration activities in critical sheep habitat areas, particularly in lambing grounds during lambing season and watering sites during late spring and early summer.

The proposed action is in conformance with the Vermillion Management Framework Plan (MFP).

II. ALTERNATIVES CONSIDERED

A. Do not transplant any desert bighorn sheep to either area.

B. Transplant sheep to only one of the two areas.

C. Significantly reduce the number of sheep to be managed in Kanab Creek (130) and Paria (175).

III. DECISION AND RATIONALE

The decision is to select the proposed action modified as follows:

Release desert bighorn sheep into the Paria Canyon-Vermillion Cliffs area as soon as possible after the habitat plan and cooperative agreement are approved and when the sheep become available.

Delay the release of sheep into the Hacks Canyon-Kanab Creek area of the habitat plan until public controversy is reduced and resource conflicts are resolved.

As soon as these conflicts are resolved to the satisfaction of both agencies, bighorn sheep will be released. The intent is to establish a population of 130 bighorn sheep in this area by the year 2000.

Two adverse comments were received on the Paria Canyon-Vermillion Cliffs release area. One comment was against allowing new livestock waters within two miles of bighorn habitat on BLM-administered public lands. The other expressed concerns about possible contamination of water and sheep grazing on private land. The latter has been satisfactorily resolved. However, the concern regarding now allowing the construction of new livestock waters within two miles of bighorn sheep habitat has not been resolved. This proposal will be reevaluated once bighorn populations are established to see if the proposal in whole or in part may be dropped depending upon bighorn use areas. In any case, livestock waters proposed within the two mile zone will be evaluated on a case-by-case basis and may be allowed if a determination is made that the benefits of the new water outweigh the need to protect bighorn habitat.

Public comments on the environmental analysis identified several real or perceived resource conflicts concerning livestock grazing and mining, particularly in the Hacks Canyon-Kanab Creek area. Mining companies are anticipating passage of the proposed Arizona Wilderness Bill, which would drop some wilderness study areas from further study. Consequently, exploration activity would intensify and create more conflict with bighorn sheep.

Livestock concerns centered around the idea that livestock use would be reduced to make a refuge for bighorn. Although livestock reductions are not proposed, it is perceived in that manner, partly because permittees in several allotments in this area had grazing decisions issued in 1981. These decisions proposed reductions in three phases over a 5-year period unless monitoring studies indicated they were not necessary. The initial reduction was made in compliance with the Vermillion Grazing Environmental Statement. Evaluations will be conducted in November 1984 and November 1986 to determine if further reductions are warranted.

If these studies indicate livestock reductions are necessary, the bighorn sheep release will take the brunt of the blame, especially if they are released before the final decision. If bighorn sheep are not released until after monitoring studies are completed for livestock grazing, however, this misconception would be avoided.

The opposition regarding mining conflicts comes mainly from Energy Fuels Nuclear, Inc. (EFNI) and deals especially with exploration. The Hacks Canyon area is in a wilderness study area. EFNI has not explored this area to the extent they would like, because of restrictions imposed under Interim Management Guidelines.

Aside from this area going through regular BLM procedures for wilderness study, a bill has also been introduced into Congress. If passed as introduced, the bill would include approximately half of the suitable bighorn sheep habitat. The remaining habitat would be "dropped" from interim management.

The bill would allow EFNI to explore with fewer restrictions. They do not wish to face further conflicts with bighorn sheep. They recognize bighorn sheep could not restrict their right to explore and mine under the 1872 mining law. However, they still feel that if the sheep were disturbed by their operations, EFNI would be blamed and more controversy would result.

While there is no doubt about the legality of the operations, bighorn sheep are a sensitive issue at any time and putting them in an area where exploration or mining is apt to occur could create considerable controversy. Probably some adverse impacts would be reduced because EFNI has a good record of cooperating with BLM and they would likely continue to cooperate with future exploration. If a mine were developed it would be unfeasible to delay or shut down operations. A likely adverse impact would result to bighorn sheep in the immediate area of a mine.

To delay releasing bighorn sheep into the Hacks Canyon-Kanab Creek area until these resource conflicts are resolved would be prudent. Public controversy would then likely be reduced.

There is also considerable support for reintroduction of the sheep. A successful establishment of desert bighorn sheep will help to reverse the overall downward trend of populations in the southwest and likely enhance wilderness values. Consumptive and non-consumptive recreational activity and revenue for the Arizona Game and Fish Department would also increase. The value of increased hunting activity is expected to reach $19,200 annually once population goals are reached.

The adjacent land management agencies -- including the Kaibab National Forest, Glen Canyon National Recreation Area and Grand Canyon National Park -- support the release, with limited reservations.

BLM anticipates that much of the concern will be resolved in the next 2 to 5 years. The action on the proposed wilderness legislation should be known. If part of the habitat area is dropped, the mining company would probably begin more intensive drilling in the area and would have data to evaluate within 1 or 2 years. If the wilderness area is not deleted, BLM's recommendations should be completed through the regular process. In addition, the grazing decisions will be completed and whatever happens on that issue would not be influenced by bighorn sheep. This issue should then be resolved.

IV. MITIGATING MEASURES

The following measures have been accepted.

A. The access route to the Hacks Canyon release site should be improved using only hand tools and only to the degree absolutely necessary.

B. Construct the release paddocks by hand and remove only that vegetation necessary for the construction of the paddock.

C. Broadcast a seed mixture of galleta grass, dropseed, and fourwind saltbush at the rate of 10 lbs/acre on the access route and any other disturbed area after the paddocks are removed.

D. Paria Canyon hikers will be notified that a helicopter will be used in the canyon.

E. The superintendent of Glen Canyon National Recreation Area will be notified 48 hours in advance of helicopter use.

F. Livestock waters proposed within 2 miles of bighorn sheep habitat will be analyzed on a case-by-case basis to determine if the benefits to livestock management outweigh the need to protect bighorn sheep habitat.

G. BLM and Arizona Game and Fish Department will discuss and evaluate annually at coordination meetings to determine when the sheep should be released in Hacks Canyon. Proper documentation and coordination will be accomplished at that time.

V. CONCLUSION

The actions as proposed apply only to those necessary for the transplanting of desert bighorn sheep and are temporary in nature. As accepted they meet Wilderness Interim Management Policy guidelines and will have no impact on future wilderness designations. The establishment of bighorn sheep populations is consistent with and will enhance wilderness values. Future project development such as waters will be evaluated separately.

Based on the analysis in the attached EA, I conclude that this action will not result in significant impacts to the environment. Although some public controversy is associated with releasing bighorn sheep, it is not sufficiently significant to require an EIS.

G. William Lamb

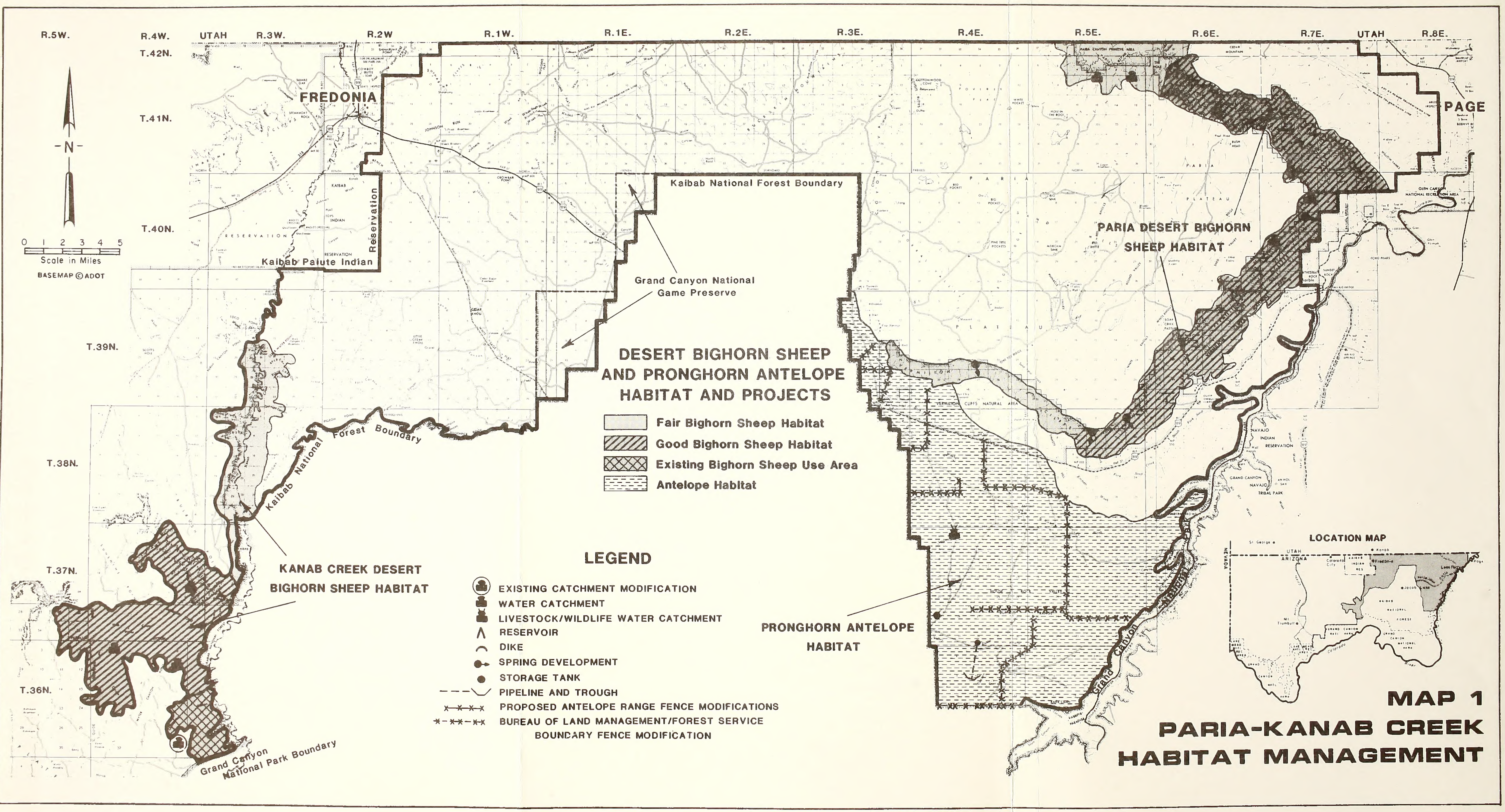
G. William Lamb, District Manager

11/18/83

Date

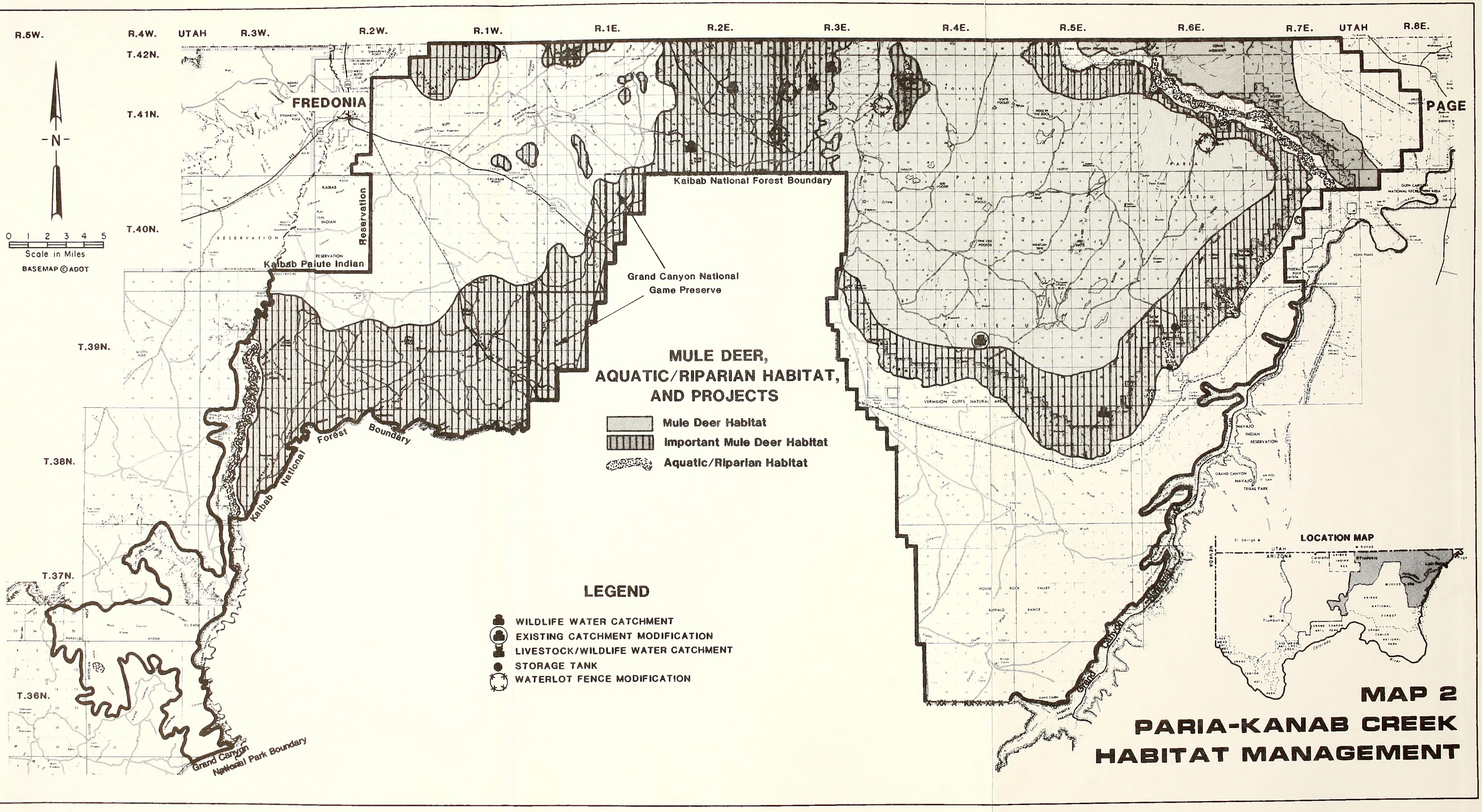
MAPS

XIII. MAPS

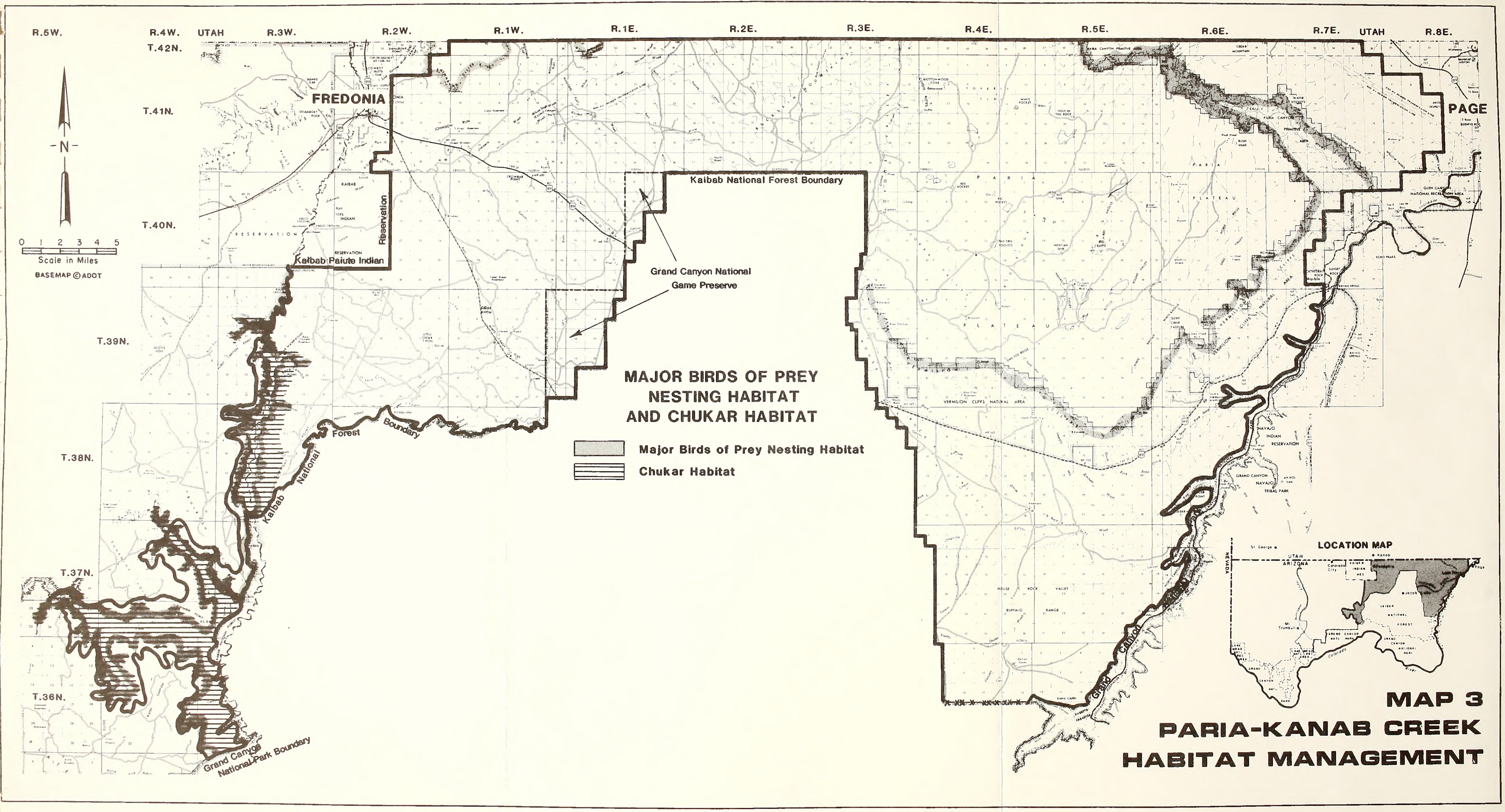


MAP 1
PARIA-KANAB CREEK HABITAT MANAGEMENT

DESERT BIGHORN SHEEP AND PRONGHORN ANTELOPE HABITAT AND PROJECTS
▢ Fair Bighorn Sheep Habitat
▨ Good Bighorn Sheep Habitat
▩ Existing Bighorn Sheep Use Area
▤ Antelope Habitat
LEGEND
EXISTING CATCHMENT MODIFICATION
WATER CATCHMENT
LIVESTOCK/WILDLIFE WATER CATCHMENT
Λ RESERVOIR
⌒ DIKE
SPRING DEVELOPMENT
● STORAGE TANK
PIPELINE AND TROUGH
-x-x-x- PROPOSED ANTELOPE RANGE FENCE MODIFICATIONS
-x-xx-xx- BUREAU OF LAND MANAGEMENT/FOREST SERVICE BOUNDARY FENCE MODIFICATION
R.5W.
R.4W.
UTAH
R.3W.
R.2W
R.1W.
R.1E.
R.2E.
R.3E.
R.4E.
R.5E.
R.6E.
R.7E.
UTAH
R.8E.
T.42N.
T.41N.
T.40N.
T.39N.
T.38N.
T.37N.
T.36N.
N
0 1 2 3 4 5
Scale in Miles
BASEMAP © ADOT
FREDONIA
PAGE
Kaibab Paiute Indian Reservation
Kaibab National Forest Boundary
Grand Canyon National Game Preserve
Kaibab National Forest Boundary
KANAB CREEK DESERT BIGHORN SHEEP HABITAT
Grand Canyon National Park Boundary
PARIA DESERT BIGHORN SHEEP HABITAT
PRONGHORN ANTELOPE HABITAT
PARIA PLATEAU
VERMILION CLIFFS NATURAL AREA
NAVAJO INDIAN RESERVATION
GRAND CANYON NAVAJO TRIBAL PARK
Grand Canyon
LOCATION MAP
UTAH
ARIZONA
NEVADA



MAP 2
PARIA-KANAB CREEK HABITAT MANAGEMENT



MAP 3
PARIA-KANAB CREEK HABITAT MANAGEMENT

MAJOR BIRDS OF PREY NESTING HABITAT AND CHUKAR HABITAT

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